

# *The* **Communicator**

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A Publication Of Surrey Amateur Radio Communications



## PUBLICATION CONTACTS

**COMMUNICATOR  
& BLOG EDITOR** John Schouten VE7TI  
[communicator at ve7sar.net](mailto:communicator@ve7sar.net)

**SARC TELEPHONE** (778) 683-4662

**CORRESPONDENCE** 12144 - 57A Avenue  
Surrey, BC V3X 2S3  
[SARC at ve7sar.net](mailto:SARC@ve7sar.net)

**CONTRIBUTING  
EDITORS** John Brodie VA7XB  
Kevin McQuiggin VE7ZD/KN7Q

The **Communicator** is a publication of Surrey Amateur Radio Communications.

It appears bi-monthly, on odd-numbered months, for area Amateur Radio operators and beyond, to enhance the exchange of information and to promote ham radio activity.

During non-publication months we encourage you to visit the Digital Communicator at [ve7sar.blogspot.ca](http://ve7sar.blogspot.ca), which includes recent news, past issues of The Communicator, our history, photos, videos and other information.

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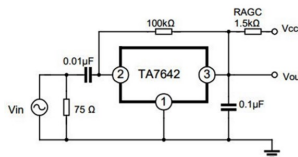
## IN THIS ISSUE

***Moonbounce (EME)***—Kevin VE7ZD on his latest project

***Solder Splatter and Tech Topics x3!***

Daniel VE7LCG with another set of fabulous projects.

***All About Soldering***  
*A Skill we use frequently*







# QRM

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...from the Editor's Shack

*Do you have a photo or bit of SARC news to share? An Interesting link?*

*Something to sell or something you are looking for?*

*eMail it to [communicator at ve7sar.net](mailto:communicator@ve7sar.net) for inclusion in this publication.*

First of all, on behalf of The Communicator team, let me start by wishing everyone a Happy New Year. We also hope you got something in your Christmas stocking to make our hobby even more enjoyable.

We also thank Jinty for organizing another great Christmas lunch. There was entertainment, a good meal and lots of door prizes. You will find photos on page 68 of this publication.

At the end of November we wrapped up our largest Basic class ever and we're following that up with a January CW course and our next Basic course starting February 25th. One of four NEPP members in the class, Frank achieved a 100% exam score and there were several others in the 90s.

After taking the course with his dad, one of our youngest class members, Noah also passed his exam. Dad was one of the high scoring grads.

Special mention of our January General Meeting, on the Wednesday the 8th. We are offering a presentation and discussion

on how to get on the air and improve your station. We also encourage members to bring used equipment and accessories to this meeting so that our recent students have an opportunity to purchase some good used gear.

We've noticed a drop in check-ins for our Tuesday evening weekly Net. Hopefully this is holiday related, but we encourage you to turn on your radio to check-in and hopefully stay for the roundtable afterwards. On the subject of the Net, we could use some additional net control operators. It is one of the best ways to build confidence in your radio skills and your station.

Finally, we say a fond farewell to Michael Birtles VE7GMP. He is moving to Alberta to be nearer his girlfriend who is studying medicine. He hopes that his future brings him back to BC however. Thanks Michael for all your contributions to SARC events and we wish you all the best.

~ John VE7TI  
Communicator Editor



## ***This Month's Cover...***

*In this issue Kevin VE7ZD profiles the most northerly amateur radio club in Canada, VY0ERC.*

*This is VY0ERC on Ellesmere Island in Nunavut. The folks operating this station are there for scientific research and Amateur Radio is one of the few off-duty pastimes they have. They are faced with pretty tough operating conditions!*

## **On the Web** [ve7sar.net](http://ve7sar.net)

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**or**  
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**"Would you rather change the past, or see the future?" - Isaac Asimov**



## The Rest Of The Story...

### *Harald Trap Friis*



**Harald T. Friis was born in 1893 in Naestved, Denmark,** and graduated in electrical engineering from the Royal Technical College in Copenhagen in 1916. He then spent about two years at the Royal Gun Factory in Copenhagen. In 1919 he received a fellowship which enabled him to come to the United States where he studied radio engineering at Columbia University under John H. Morecroft. In 1920, Friis joined a research group headed by Edwin H. Colpitts at the Western Electric Company, a group which became part of Bell Laboratories in 1925.

Friis initially was assigned to investigate radio reception from ships at a station in Elberon, NJ. He designed a double-detection superheterodyne receiver and undertook a long series of measurements of field strength and noise over a wide range of frequencies. He developed techniques to compensate for signal fading and used oscillographs to determine phase differences and other propagation phenomena. He and two colleagues published an important IRE paper on radio transmission measurements in 1923. They stressed the need to measure signal to noise ratio rather than field strength alone and discussed how to achieve satisfactory radio communication while minimizing equipment cost. Friis published further results of his research in his December 1925 IRE paper on directional antennas,

in a 1926 paper on the static recorder in the Bell System Technical Journal, and in a May 1928 IRE paper on oscillographic observations.

Friis assisted in the design of the receiving system used by his colleague, Karl Jansky, to detect and record galactic radio noise in the early 1930's. These observations launched the new science of radio astronomy. Friis and Edmond Bruce were co-inventors of the rhombic antenna [see bottom page 5] which came into wide use as a shortwave antenna. Friis subsequently designed a multiple-unit steerable antenna (MUSA) which employed an array of rhombics and was altered for optimum reception of shortwave signals. He received the Morris N. Liebmann Award of the IRE in 1939 in recognition of his many contributions to radio science and engineering.

In 1938, Friis became the director of a research team at the Holmdel laboratory facility of Bell Labs with the mission of developing microwave systems. He and a colleague, Alfred C. Beck, designed a horn-reflector antenna which became widely used. The Holmdel group went on to develop both microwave radar and communication equipment used by the military during World War II. Friis invented an ingenious "rocking horse" mechanical scanner for a radar set used to locate enemy mortars. In a May 1946 IRE paper, he disclosed a radar transmission formula which had proven

*He designed a double-detection super-heterodyne receiver*



useful to the group at Holmdel. A microwave relay network based on their work was installed for commercial use in the US soon after the war.

Friis was also widely recognized for his leadership skills. He did not seek attention and thus often did not gain acclaim for his own important work. He was a more natural collaborator, and his assistance to others was deeply appreciated. His work as a teacher and supervisor was seen as invaluable; conversations with Friis frequently helped other engineers sharpen their work and make great progress.

In 1954, Friis received the Valdemar Poulsen Medal of the Danish Academy of Sciences. The following year, he received the IRE Medal of Honor, "For his outstanding technical contributions in the expansion of the useful spectrum of radio frequencies, and for the inspiration and leadership he has given to young engineers." He also received the Ballentine Medal from the Franklin Institute in 1958 and the Mervin Kelly Award of the IEEE in 1964. He retired from the Bell Labs in 1958 but continued work as a research consultant to the Hewlett-Packard Company for the next decade. His autobiography, entitled *Seventy Five Years in an Exciting World*, was published by the San Francisco Press in 1971. He died in 1976 in Palo Alto, CA at age 83. He was interred in Nova Scotia.

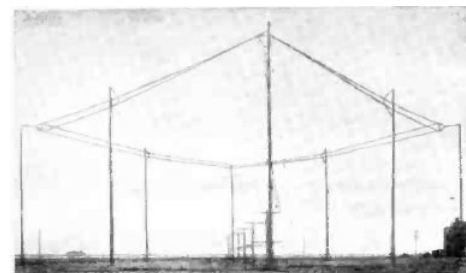
Despite fundamental contributions to telecommunications, his colleague, Dr. Pierce, said Dr. Friis was not widely known to the public. "He was deeply loved by those who knew him, but he just didn't go courting notice."

Dr. Friis is credited with a major role as a teacher and supervisor of other communications researchers. In a foreword to Dr. Friis's autobiography, published in 1971, Charles Elmendorf, an assistant vice president of the American Telephone and Telegraph Company, credited Dr. Friis with a major influence on designing the coaxial cables that carry a portion of intercity 'telephone calls and the trans-Atlantic telephone cables installed for the first time in 1956.

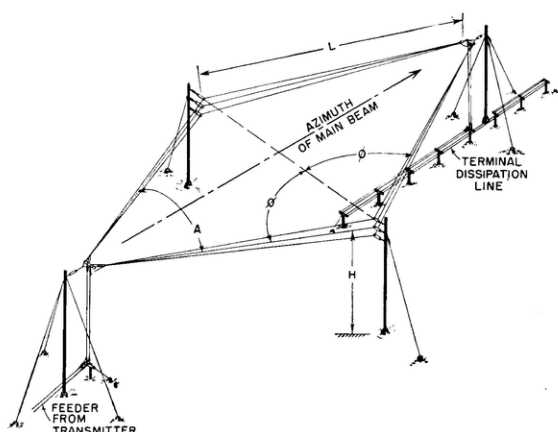
In an Introduction to the same book, Dr. Pierce wrote, "I have known cleverer inventors, more obtuse scientists, deeper mathematicians, better politicians and executives of higher degree. I have known no other man who has left as deep and profitable an impression on those who have worked for or 'with him, or who has had a clearer insight into or a surer success in the work he undertook."

And that is his story.

~



AT&T rhombic in Dixon, CA, in 1937, used for telephone service to Shanghai, China



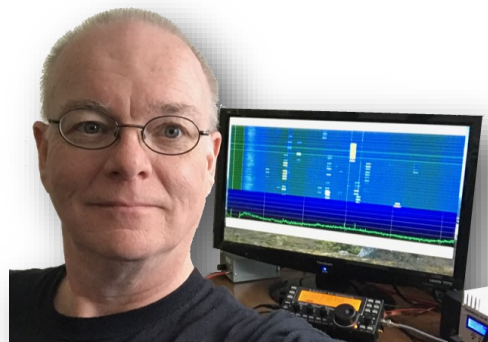
A rhombic antenna consists of one to several parallel wires suspended above the ground in a "rhombus" (diamond) shape. Long versions are typically supported by a pole or tower at each vertex to which the wires are attached by insulators. Each of the four sides is the same length. The length is not critical, typically from one to two wavelengths ( $\lambda$ ) end-to-end, but for any given length and frequency, there is an optimum acute angle at which the sections should meet.

A horizontal rhombic antenna radiates horizontally polarized radio waves at a low elevation angle off the acute end of the antenna opposite the feedline. Its principal advantages over other types of antenna are its simplicity, high forward gain and wide bandwidth, the ability to operate over a wide range of frequencies.

## Radio Ramblings

Kevin McQuiggin VE7ZD/KN7Q

### Moving Towards 2m EME



For me, ham radio is about learning, developing technical and operating skills, trying new modes and having fun.

This month I'd like to describe what I'm doing at my station to "gear up" for two metre EME (Earth-Moon-Earth, or "moonbounce") operation. After getting set up for six metre meteor scatter last spring and summer (described in the August column) and having a great time on that mode, I thought that I would take the logical (at least to me) next step and get operational on EME for the "ultimate DX" QSOs of 765,000 km via the moon.

I'm not operational on EME yet but still thought that an article on the project might be of interest to SARC members.

#### EME or "Moonbounce"?

For readers new to the mode, EME uses the moon as a passive reflector for radio signals between two amateur stations. VHF and UHF signals (50 MHz up) are usually not reflected by the ionosphere. They pass through it and propagate directly into space. With

directional antennas and relatively high power, EME-ers aim their antennas at the moon and are able to hear the other station via reflection of its signals off of the lunar surface. The mode is challenging because of path loss, as signals have to travel the very long way to the moon and back.

#### A Bit of Personal History

I've been interested in EME for several decades, and in fact was operational on the mode in the early 1990s when I assembled a "Rube Goldberg" array of homebrewed and borrowed equipment to put together a minimal-capability CW station for EME on the two metre band.

I stayed active on the mode for about a year. As can happen in life, my career got in the way of the hobby, and (as I have written about before) I entered a 25+ year period of relative inactivity in amateur radio. I dismantled my EME station and much of the equipment was sold. All that remained was some aluminum from the old EME antennas, which languished under our back step, and a nice GaAsFET preamp which I had purchased new in 1990.

With my re-entry into the hobby last year, a year's experience under my belt, and spurred on by the fun I was having on meteor scatter, I thought that it was time to get going on EME again!

#### Technical Details

As we know, the power in a radio signal falls off with the square of the distance that the signal travels. The moon is on average about 382,500

km from earth. This great distance generates incredible path losses, as of course an EME signal must travel to the moon *and back*, for a total distance travelled of  $382,500 \times 2$  or 765,000 km.

Measured in decibels, the path loss for signals going to the moon and back is about 250 dB. This means that one watt transmitted will return less than one millionth of a billionth of a billionth of a watt when it returns from the moon. That's *significant* loss!

These numbers place great constraints on both our transmitters and receivers, and the way that an amateur EME station is set up. Our transmitted power (or to be more precise, effective radiated power) has to be maximized, and receivers have to be incredibly sensitive. The EME station also has to minimize the effects of noise, as the received signals will be so weak.

### **EME in the Pre-DSP Era**

In the days before digital signal processing became practical for amateur radio, the only viable operating mode for EME was CW. Only a few amateur "super stations" in the world had the capability of reliably hearing reflected SSB signals off of the moon. On CW, the signals heard were usually just barely out of the noise. It could take an hour to exchange signal reports and complete a QSO.

Working smaller stations with my minimal setup (of the day) was simply not possible given the specs of receivers in that era and the reliance on analog modes. At my EME station in the early 1990s I was able to copy about ten 2m "big gun" stations, and was only able to reliably work just two of them. I considered this a reasonable success for my investment in time and equipment.

This all changed with the development of personal computers and digital signal processing in the 21<sup>st</sup> century.

### **The Modern Era**

Developments in computing power and the field of digital signal processing in the past 20 years have had the effect of increasing the receive sensitivity of the typical amateur radio station by many times. Modes such as FT8 have incredible spectral efficiency (more signals in a given bandwidth) and sensitivity. Your personal computer can decode FT8 signals that are "below the noise floor" (inaudible), and well

below (15 dB, or about 32 times weaker) the level that CW can be decoded by the human ear.

EME operation has benefitted from this digital revolution as well, and the requirements for an effective moonbounce station are much more achievable today than they were before the year 2000.

### **Bands and Modes**

Modern EME operations utilize the JT65 mode that is available within the popular WSJT-X software package. WSJT-X is open source and available from Princeton University [1]. JT65 has incredible sensitivity and has been optimized for moonbounce operations. See Figure 1 for a typical JT65 EME screenshot and note the weakness of the signal in the centre of the waterfall. Reception and decoding of JT65 takes about 47 seconds per frame. EME is not for the impatient!

If you are active on FT8 then you have all the computer-radio interfaces and cabling you need to run JT65.

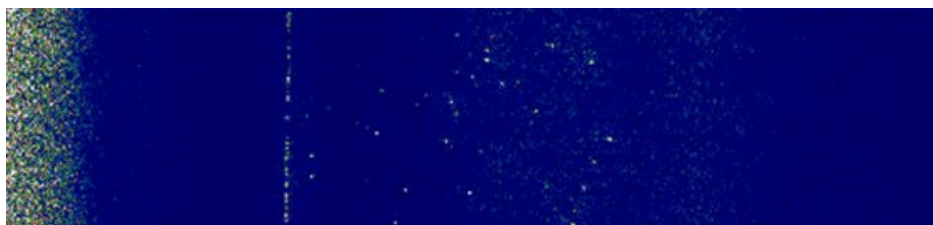


Figure 1 - Typical JT65 EME Waterfall

EME setup and operation remains very challenging, however, and while (as we shall see) the minimum station requirements have been greatly reduced due to DSP techniques, the interested ham must still do a lot of detailed planning to maximize his or her transmitted signal, reduce system noise, and achieve sufficient gain to hear the very, very weak lunar echoes.

EME operation is conducted on all amateur bands from 6m (50 MHz) up. The most popular band is two metres. There are several hundred 2m EME stations worldwide, and many hams have achieved DXCC using 2m EME. Paper chasing aside, in my mind, one of the biggest advantages that 2m has is that the antennas are small and portable. Directional antennas are a must, so most operators use long Yagis with high gain of at least 12 dBi.



There is also lots of 6m and 70cm EME activity, and lesser amounts on 222 MHz, 1296, and the 10 GHz bands. Equipment however is harder to find for these bands than it is for 2m.

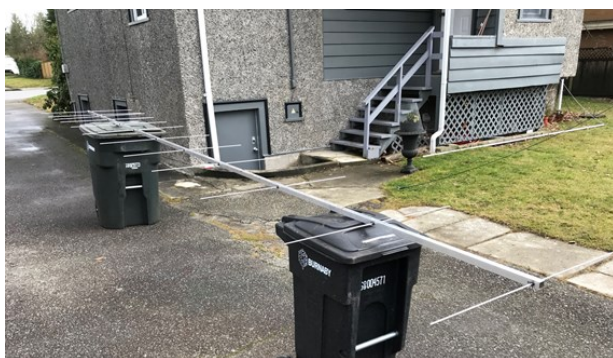
### **My New EME Station**

The normal operating environment for my 2m EME station will be portable, as I lack yard space at home and noise levels in the city are high. I want to get out to the country where spectrum noise is reduced.

I chose 2m for my station because of the popularity of the band worldwide and the ready availability of antennas, transceivers, transverters, amplifiers, and preamplifiers for the band. I rejected 6m EME (although I have all the basic equipment given that I am active on 6m meteor scatter) as the antennas are too big and could not be easily transported for portable operation.

#### **A) Antenna:**

My station will be based on a homebrew 12-element 2m Yagi. See Figure 2 for a photo of the antenna on its high-tech final assembly stand.



*Figure 2 - My Homebrew 12-element 2m Yagi*

Ironically, I have just finished building this antenna from aluminum scrap that was left over from my original 2m EME Yagis in the early 1990s. It'll be great to use the same aluminum again in a "reborn" EME station!

Building a new antenna based on a modern design was a much better idea than simply rebuilding the old antennas - computing power has greatly improved antenna design, and the new homebrew Yagi, as a product of the latest open source antenna design software will have much more gain than the old one ever did. The new Yagi should have about 14 dBi forward gain. Using the club's antenna analyzer, the antenna's SWR is an impressive 1.11.

Antennas for 2m EME do not have to be at great height. Two or three metres above ground (about a wavelength) is all that is required. Tracking the moon is an important aspect of EME operation. My tracking system will be entirely manual. I will support the antenna on a PVC mast and affix it to a wooden stepladder using bungy cords. I'll adjust azimuth and elevation manually using visual observation of the moon. The antenna pattern is relatively broad so I will only need to adjust the antenna position every 15 or 20 minutes. This is a "KISS" operation!

#### **B) Portable Operation:**

The boom length of my new Yagi is just under 20 feet, but I am going to chop the boom in half so that I can easily transport the two halves of the antenna on my vehicle's roof rack. I live in an urban area (Burnaby) and like all cities RFI and electrical noise are big factors on the 2m band. EME reception needs a low receiver noise floor. I will go portable and travel to less populated areas (say, out towards the valley, or north towards Whistler) in order to reduce my received noise.

#### **C) Preamplifier:**

On the receive side, a low noise preamplifier is necessary because the signal echoes received from the moon will be so weak. Low loss feedline is also critical, but it is more effective to place the preamplifier right at the antenna feed point, or as close to the feed point as is practicable.

Receiver performance for an EME station is the most important factor. As the 100-year-old saying goes, "You can't work 'em if you can't hear 'em" [2], and the return on investment from improving your receive performance and lowering your noise floor is greater than anything else you can do.

For my new station, I am going to deploy my receive equipment for several weeks first and spend time improving RX performance and lowering my noise levels before I even consider transmitting. If I can't hear stations off of the moon, I will never be able to work them!

#### **D) TX/RX Switching:**

A preamplifier at the antenna feed point presents a problem for the transmit signal, as the preamp cannot pass hundreds of watts of RF without breaking down. This necessitates a system of antenna relays or coaxial switches to switch the preamp out of the transmit circuit when the station goes into transmit mode. In the early 1990s I used secondhand relays and switched from RX to TX manually.

Fortunately, today coaxial relays are commonly available and pretty cheap [3], and some newer preamplifiers are even designed with internal relays that can handle up to 1000 watts. I went with a very good 2m switched preamplifier from a company in the Ukraine called VHF Design [4]. See Figure 3. This will protect the preamp from damage when the station goes into transmit mode.

Figure 3 - [top right] 2m High Power Switched Low Noise Amplifier (LNA)

If your preamplifier doesn't have internal relays, then you can use external relays and a "sequencer". The sequencer handles the timing of switching relays, preamplifiers and power amplifiers in and out of the feedline to your antenna. These days, automatic sequencers can be commanded by your computer to automatically switch your preamplifier in and out safely. See Figure 4. These boards are cheap [5] and interface directly with popular rig control software.

Figure 4 - [right] Sequencer Board

#### E) Transmitters and Amplifiers:

In the 20<sup>th</sup> century, EME required maximum legal power, or as near to maximum as the operator could achieve. In the early 1990s, I was fortunate to have use of a surplus "Henry 2002" linear from a local university. See Figure 5. It had been retired from service in an emergency communications project. AC power limitations at home meant that the most I could wrest from this 75 kg monster was about 900 watts. That linear was a bit scary: the house lights would dim when I was on the air and my then-new wife Laura (VE7LPM) was nervous. I persevered and was able to make a few contacts, but my setup was marginal.

Figure 5 - [bottom right] Henry 2002 Linear

Fast forward to today, and such high power is not necessary anymore for EME contacts. More power is always better, and many EME stations around the world still run a kilowatt, but with the new LDMOS (MOSFET) solid state amplifiers a water-cooled kilowatt linear amp can be purchased for only about USD\$1000 [6]. These new solid state amps weigh about

one tenth of what the old Henry 2002 weighed, and are much safer.

Most 2m EME operators today run 100 to a few hundred watts to one or two long boom Yagis. This power level is easily achievable with either homebrew, new commercial, or used equipment. DSP and the incredible power of home computing and free software such as WSJT-X make kilowatt-level power unnecessary for 2m EME contacts.

Contacts between a station using 100 watts and a single Yagi and bigger stations are routine, but a single Yagi low power station will probably have difficulty contacting other small stations on a regular basis. "Single Yagi/100 watts" can be considered the modern day "minimal" station. More power, even a few hundred watts, will generate better results and contacts with at least a couple of hundred other EME stations will be possible. I am designing my station to run about 350 to 400 watts for this reason.

For my station, I purchased a new 2m amplifier from TE Systems [7] that will generate 350 to 400 watts from 25 watts of drive. The amplifier has a built-in low noise preamp, and internal switching relays that will protect the preamplifier when the amplifier is in transmit mode. The amplifier measures only about 30x30x8 cm and weighs maybe 3 kg. It runs off 13.8 volts. A far cry from the massive Henry 2002 that dimmed the power grid for our whole neighbourhood!

#### F) Transceiver:

I will drive the amplifier from my Elecraft KX3. The small form factor and light weight of the KX3 will be perfect for my portable 2m EME station. I'll use a transverter from Q5 Systems [8] on the KX3 to convert its 5 watt 28 MHz (ten metre) "base band" signal up to two metres at 25 watts, then this 2m signal will drive the amplifier to 350 - 400 watts, which will feed the antenna. Received signals on 2m will be down-converted by the transverter back to the 10m band, where the KX3 will demodulate them and pass them to WSJT-X. A transverter is unnecessary if you have a multimode 2m rig in the first place!

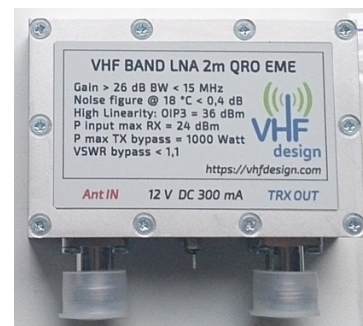


Figure 3 - 2m High Power Switched Low Noise Amplifier (LNA)



Figure 4 - Sequencer Board



Figure 5 - Henry 2002 Linear

### **Project Status**

My equipment has been assembled and tested. I am awaiting better weather to start running some receive tests with the new Yagi, the VHF Design preamplifier, and my KX3. I will conduct the first tests in the backyard, unless RFI and electrical noise prove to be too much for the receiver. If the local noise floor is too high, then I will go portable. I am hoping initially to be able to see some JT65 waterfalls and decode at least a couple of transmissions from the bigger EME stations.

Once I have receiving working, I will move to the task of getting the amplifier set up. This will probably involve deploying the station in a portable mode somewhere in the Lower Mainland.

Ultimately, I would like to reach operational status on EME in about a month, and then participate in the late January ARRL VHF/UHF event. I'm looking forward to making my first EME contact in nearly 30 years!

### **Stay Tuned!**

That's it for this month! Feedback can be directed to the Editor, or directly to me at [mcquiggi@sfu.ca](mailto:mcquiggi@sfu.ca).

~ Kevin VE7ZD / KN7Q

### **Article References:**

[1] <https://physics.princeton.edu/pulsar/K1JT/wsjsx.html>

[2] QST, 1930s, exact reference unavailable. Attributed to Hiram Percy Maxim, 1AW.

[3] For example, <https://ebay.com>, search for Tohtsu CX-140N

[4] <https://vhfdesign.com>

[5] USD\$20 from VHF Design, see [4]

[6] <https://eb104.ru/internet-magazin-shirokopolosnye-usiliteli-moschnosti-pa1000w>

[7] <https://www.tesystems.com>

[8] <https://www.q5signal.com>

*Congratulations to Noah, age 13, a graduate of our Fall 2019 course, at 27 students, our largest class ever. His dad Beau VE7MYG [right] who also graduated from this class, and John VE7TI, one of the instructors. But they're not stopping there. Both are also taking the January CW course.*





## Radio Ramblings II

### Safety First!

Kevin McQuiggin VE7ZD/KN7Q



#### A Reminder to All of Us of the Need to Stay Safe

This story has a couple of graphic photos, but they serve to illustrate the need for safety.

While I was working on the homebrew 2m antenna described as part of my Radio Ramblings column this month, I had to do a lot of metalwork in the home shop in our basement. Drilling the boom; cutting some notches; filing things down - it generated a lot of little metal bits that got underfoot. I decided that I should vacuum the floor to clean up the shop.

I got out the Shop Vac and worked vigorously - *back and forth, back and forth*, trying to get the last of the little metal bits up. They stuck to the floor, so my focus was on getting every last one sucked up. I wasn't watching my surroundings.

Then it happened. On a fast forward stroke of the vacuum, my left forearm hit the sharp edge of a 6-foot piece of metal moulding that I had placed aside from an earlier project. The metal dug into the top of my forearm, ripping the skin and digging almost a centimeter deep into my arm. See Figure 1.



Figure 1 - OUCH!

Blood was everywhere. I knew it was serious. I folded a big hanging chunk of skin back into my forearm, rushed

to the basement sink, flushed the wound and wrapped it in a handy towel. I called to my wife Laura VE7LPM and she rushed me to Burnaby General Hospital where I got admitted to Emergency.

In a matter of a few hours I was tended to by an ER doctor and his eager UBC medical student. They inspected the wound and stitched me up. See Figure 2.

Figure 2 - All Stitched Up



Three weeks later and my wound is still healing. Secondary treatment on one of the three cut tracks of the wound was necessary as it had been too deep for stitches to work. Basically, that part of the injury had to be cut open again and packed with sterile wick to get the track to heal from the bottom up. This was not a fun experience.

The metal missed a major nerve in my arm by likely a millimeter or two. If the metal had cut it, then I would have lost partial use of my hand. Scary!

I am on the mend, but the injury reminded me that situational awareness is necessary when working on all parts of a project. As hams we always have many types of radio projects on the go. We all need to make sure that we remain aware of our surroundings and do the various tasks safely. Stay safe everyone!

~ Kevin VE7ZD/KN7Q



## Tidbits from the Amateur Radio World

### LMR-400 vs 400 UF

From [towertalk@contesting.com](mailto:towertalk@contesting.com)

I have seen some ham suppliers indicating that LMR-400 is good for up to 20 years of life, on average (correct per Times Microwave, the mfr). Then they give the spec on LMR-400 UF (ultra-flex) without rating the life of the UF version. These suppliers do point out that LMR-400 has a PE (polyethylene) jacket, and that the 400 UF has a TPR (thermoplastic rubber) jacket.

As an RF cable design engineer, I am aware that TPR is used on the 400 UF to provide extra flexibility to the build, versus using PE, and PE would reduce the flexibility of a stranded center conductor of the UF version. The 400 has a solid center conductor, less flexible than a 7 strand center conductor as is the UF version.

TPR used on the UF version has nowhere near the life of 20 years that the PE version does. Times Microwave describes the UF version as having an outdoor life "in excess of 10 years". Of course any life expectancy is dependent on ambient conditions, particularly temperature and UV. I have never recommended that UF will last up to 10 years in UV. A great, less expensive and longer lasting alternative is Belden 9913F7 (not to be confused with the totally different construction of 9913). It is equivalent, mechanically and electrically to LMR 400 UF, but the key aspect is that Belden uses a patented "Bell Flex" jacket, a PVC concoction, that has excellent flexibility, UV resistance and will last a lot longer.

Customers often want to run a flexible cable from the shack out and up the tower, but that expense is not really necessary. LMR 400, 400 UF and DRF-400 all have 1" bend radius's (2" is safer), and Bury-Flex Tm (2").

So, why do you really need a full shack-to-antenna run of 400 UF or 9913F7 or Bury-Flex Tm? Use a lower cost low loss cable to the tower top (such as DRF-400 Tm.) Then use the flexible cable for the rotor loop. So what about connectors in the cable? High quality commercial connectors, such as carried by Davis RF, only interject .002 dB at their MUF (maximum usable frequency), so two males and a barrel connector amount to only .006 dB at the MUF of that type of connector. MUF for a quality UHF connector is 300 MHz. At 30 MHz the insertion loss of each connector and barrel is only 10 % of .002 , or .0002 dB for each! MUF for N types is much higher.

So, if you bought 300 ft of an expensive UF, and now feel like hanging yourself, I also have plenty of rope: Davis Rope and Cable Assembly Co. [www.Davisropeandcable.com](http://www.Davisropeandcable.com). is totally separate from DAVIS RF [www.DavisRF.com](http://www.DavisRF.com).

DRF-400 and Bury-Flex are trademarked by DAVIS RF. LMR is a registered Tm of Times Microwave Systems. Davis RF claims to have the lowest prices available from any ham dealer for low loss coax and hardline such as HELiAx tm and Times LMR. FREE delivery (within USA) for orders \$75 or more.

Steve Davis, Snr. RF Cable Design Engr. & Founder, DAVIS RF Co. <[sdavis@davisrf.com](mailto:sdavis@davisrf.com)>  
Division of Orion Wire Co., Inc.

## Page 13—News You Can Lose

The Lighter Side of Amateur Radio

### Regulations Enforcement News



By WBØRUR, on the scene

**SAUSALITO, NV** - A local ham radio operator has been cited for careless and imprudent radio operating by the Federal Office Responsible for Monitoring All Transmissions (FORMAT).

The photo of "Chick" Brown below, shows him asleep in his shack, while cradling a dual-band HT.

Robert "Chick" Brown dozed off during the 40 meter "Thanksgiving Day Net," a traditional radio gathering since 1942, where hams "check-in" to offer thanks for the blessings of the past year.

As Junior Thompson offered thanks on the net for the blessing of his Kenwood TS-990 due to a large worker's comp settlement check, Brown's VOX opened up and he was heard snoring with 1500 watts P.E.P. delivered into a 7-element Yagi.

In a prepared release, the National Radio Retransmission Legion (NRRL) defended Brown's indiscretion, saying it was directly related to the amount of turkey consumed immediately prior to the net and that the broadcast was purely

unintentional. (Reporter's note: the chemical tryptophan-L, found in turkey, can induce sleep when ingested in large doses.)

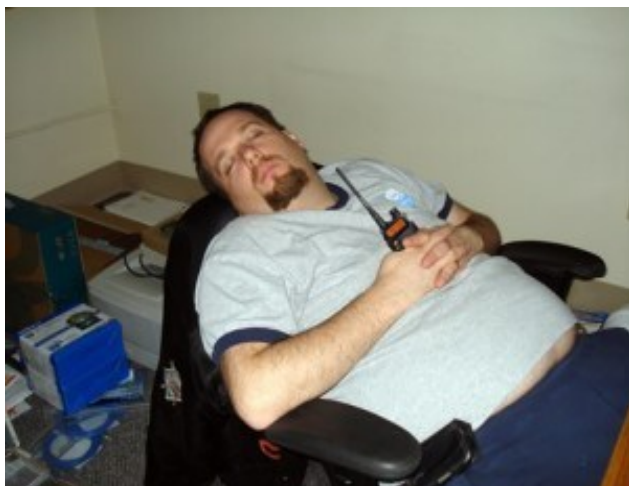
FORMAT says agents immediately received world-wide complaints about "the buzz-saw noise" emanating from North American shores.

NRRL spokesman Johnson Longfellow says the "... combination of turkey, dressing, cranberries, Watergate salad, and candied yams played the devil with Brown's metabolism, placing him in a stupor seldom paralleled in the annals of modern medicine."

For their part, the local ham radio club "Emergency Response Team" was called away from their Thanksgiving tables and placed into action to triangulate the origin of the signal and shut it down.

Brown has 45 days to file an appeal with the Federal Office Responsible for Monitoring All Transmissions, but the sleepy ham says he'll "... probably just pay the fine and move on, since Junior will spot me some left over worker's comp money. And maybe I will try not to eat so much turkey next year."

~ ### HamHijinks.com



*In 1992, Ernest Cassidy put his turkey on his quad, then put 1200 watts of RF through it.*



*He made nine 6m contacts and the bird was cooked eight minutes faster.*

HamHijinks.com

#HamHijinksFacts



## Radio Ramblings III

Kevin McQuiggin VE7ZD/KN7Q

### VY0ERC Interview



#### See also:

[TCA Article on the Eureka Weather Station](#)

Late last summer I was fortunate enough to make an FT8 QSO on 20 metres with VY0ERC, the Eureka Amateur Radio Club on Ellesmere Island, Nunavut. I answered VY0ERC's CQ, made the FT8 exchange, and logged the contact.

As is my practice, as the QSO progressed I looked up VY0ERC on [qrz.com](#), and was intrigued to learn that this club station is at the most northerly located amateur radio club in the world. The photos on QRZ are amazing, and they made a real impression on me of what it might be like to operate at such a high latitude (grid square ER60, 80.05 degrees N) and in such extreme weather conditions. See Figure 1.

The club's web site details the challenges of keeping amateur radio equipment (and in particular, antennas) running in such extreme weather, and I decided to make a

small donation to the club's effort to acquire and deploy better antennas for the lower HF bands.

I also thought that it would be interesting to follow-up my curiosity about VY0ERC's operating conditions, their equipment and membership, challenges, and other factors and write an article here in the Communicator. If I found their station and situation interesting, other SARC members likely would too!

#### The Interview

I did some more research on VY0ERC's role and learned that the club is part of an ongoing atmospheric research program. I got in touch with Pierre Fogal, VE3KTB, a club founder and the de facto "Station Manager" for VY0ERC, and he agreed to be interviewed for The Communicator. Our conversation

took place via Skype on November 6<sup>th</sup>.

**Kevin:** Thanks for taking the time to speak with me. How did you get involved with VY0ERC and working in the far north? What is your role in the work?

**Pierre:** It is a unique place. I am the Station Manager for PEARL, the Polar Environment

Figure 1 - VY0ERC, Ellesmere Island, Nunavut



Atmospheric Research Laboratory, and the guy who is responsible for keeping things running at the research station. I'm not there all the time, but we have operators on site throughout the year. I go onsite three or four times a year and make sure that I am there for any major system or equipment upgrades.

**K: What do you and your team do at the PEARL laboratory?**

*P: We make fundamental measurements of the atmosphere. Climate is the aspect that people are most familiar with, but climate is just one aspect of what the atmosphere is doing.*

**K: Where is PEARL located, and do your researchers live at the laboratory for the duration of your stay?**

*P: We are located approximately 11 km in a straight line from Eureka, or about 15 km by road. Eureka is on a fiord. We work at the laboratory during the day, but our room and board is provided by the Eureka weather station in a reimbursement arrangement. We commute daily.*

**K: Who funds the station and research program?**

*P: The Eureka weather station is run by Environment and Climate Change Canada, and the PEARL research laboratory is funded by a grant from NSERC (the National Science and Engineering Research Council). We also receive support from the Canadian Space Agency and ECCC (Environment and Climate Change Canada). Our researchers come from universities across Canada, the federal government, collaborators from the US and Europe, and other places around the world.*

**K: How does the amateur radio station fit in with the research efforts?**

*P: PEARL has three sites on Ellesmere Island, and the amateur radio station is located at the one we call the Ridge Laboratory. It's about 11 km*

*from the weather station and has good "takeoff" in all directions given that it is on a ridge.*

**K: Ellesmere Island is so remote; how do you get there? Do commercial airlines fly into there, or do you have to use military transport aircraft?**

*P: There's no commercial air service that far north. Commercial service goes to Resolute Bay on Cornwallis Island at 75 degrees North, so that is still 500 or 600 km SW of Eureka. So, we charter aircraft out of Yellowknife for the five- to seven-hour trip further north to Eureka. The nearest population centre to Eureka would be Grise Fjord, also on Ellesmere Island, about 400 km to the south.*

**K: How long do your teams stay at the research station?**

*P: Thankfully, Eureka is accessible year-round, so we don't have to overwinter all by ourselves. We are at PEARL 11 months of the year, currently. We used to be staffed for the full year, but recent budget cuts have meant that we now close the station for December.*

*The number of people we have on site depends on what research we are going to be conducting. Our busiest time of the year is around February 20<sup>th</sup>, at polar sunrise. This is a particularly active time for atmospheric chemistry - when the sun rises for the first time in four months. The light hits molecules and particles that have been in the dark for a long time, this causes photochemistry to take place - something that has an impact on atmospheric elements such as the ozone layer.*

*We also have a lot of activity over the summer months, and I come on site during that season as it is a good time to work on equipment, make repairs, do upgrades or work on new infrastructure.*

**K: How did the amateur radio station at PEARL start, and how long**

**has it been operational?**

*P: That's an interesting story. Eureka was established in 1947. When the station was first established, amateur radio provided the research staff with their only means of personal communication with family and friends in the south.*

*That stopped about fifteen years ago when the Internet reached the laboratory. Internet connectivity was made available to the researchers via satellite, as we have no ISPs this far north. The amateur station at Eureka was dismantled around 2005 and there was no ham radio activity from the laboratory for many years.*

*The Internet did play a role in this, as did the advent of the Iridium satellite phone system. All of this was from the weather station and there hadn't been any activity from PEARL or the Arctic Stratospheric Ozone Observatory before it.*

*I thought that it would be fun and of potential communication value to redeploy amateur radio from the laboratory. I first operated from PEARL in 2015, and that represented the return of amateur radio to Eureka.*

**K: What do you have in terms of equipment and antennas at VY0ERC?**

*P: Our main HF rig is a Kenwood TS-480, and we have an HF amplifier that was given to us by VE3AD that gives us about a kilowatt. We have various antennas that we have either bought or home-brewed.*

*Our best band tends to be 20 metres, and for that band we have a homebrew Moxon rectangle, basically a two-element beam. We also have a Cushcraft R5 vertical good for 20 through 10 and another vertical that works 80 through 10.*

**K: Maintenance of antennas through the winter months must be difficult. How do you keep the antennas operational?**

**P:** We take the antennas down in the off season and then put them back up, but lately that hasn't been enough as they have broken while we are here. We have rebuilt them on many occasions. We like to think that we have the world's strongest R5 with overlapping reinforcement tubes to cover areas where the antenna has bent due to wind and severe weather.

No antenna has survived very long. Sooner or later the extreme weather and the high winds have destroyed both wire and aluminum antennas. We had a 40m "half square" antenna that had its base legs anchored by 2x6s in the frozen ground, but the wind force on the antenna pulled the 2x6s out of the ground and was whipping them back and forth 35 feet in the air. We saw this on a webcam while we were in Eureka. It was quite the sight.

Putting a tower up is a huge engineering hurdle because there's no real mechanical strength in the ground due to permafrost. So, everything we use for antenna support has to be a non-penetrating mount. We don't have any heavy equipment to solve this problem so we have to stay with antennas that we can fasten to our building.

**K:** Do you do any VHF, UHF or satellite work at VYOERC?

**P:** We've been on the air on the FM satellites, and some folks at AMSAT sent us a Yaesu FT-847 so that we could try going onto the linear [transponder] satellites. We have made one contact as we don't have much experience in it yet.

**K:** On HF, how is propagation different than what we experience in southern Canada?

**P:** The first thing to consider is that the environment is quite different. For example, the sun goes down for four months. That means basically that 15m and 10m work is just about out of the question, certainly at this point in the sunspot cycle. In the summertime, the sun is up from April

10<sup>th</sup> to about August 29<sup>th</sup>, 24 hours a day, so trying to work 40m in a place where the sun hasn't gone down in six weeks is again challenging!

During the "shoulder seasons", where the sun is rising and setting every day, we can use all the bands. We are so far north that we can usually find propagation to an interesting other point on the globe.

**K:** Very interesting. Any other factors?

**P:** Well the other interesting aspect is that we are located basically in the middle of any northern aurora that may be taking place on the earth. That pretty much shuts us down for any HF propagation as we have the aurora borealis all around us.

It's ironic though because although we are in the centre of the auroral oval, we generally don't see the aurora borealis, as it is much further south than we are and below our horizon. We feel the auroral effects on propagation, though.

**K:** Can you describe the makeup of your typical research teams onsite?

**P:** At this time, we only have two hams, myself and Alexey, VE1RUS. We are trying to get other team members interested, especially our operators, as they are onsite for six months of the year. We had one operator who was studying for his license, but unfortunately, he moved on to another job before he got his ticket. Alexey and I are working on the new operator, though!

One of our scientists (Rachel VE3YCW) is licensed, but until last season she had never been on the air. We put her on the mic and she raised a pileup from Europe. It was a great experience for her as a new ham, and the EU hams were happy as well.

**K:** When propagation is good and the bands are open on HF, do you always find yourselves in the middle of a pileup?

**P:** Yes, we generally can generate pretty good pileups. When I started operating from PEARL we were pretty

high on the IOTA wanted list, because amateur radio had been off the air for ten or fifteen years on Ellesmere Island. We fixed that problem - we're not in the top 10 or 15 percent "most wanted" anymore!

**K:** Do you have any problems with polar bears or other wildlife at the station when you're outside, say, working on antennas?

**P:** We don't get a lot of polar bears, but I saw one last summer. There's not a lot of food for bears as we don't have a lot of seals. Therefore, we hardly ever see one.

We do have a very well-studied wolf pack. They're quite curious and will come around to see what we are doing. There are also a lot of foxes. Over a couple of years one fox made his way from Svalbard island in Norway to northern Ellesmere [a distance of 1741 km]. He wandered quite close to our facilities. The fox had a radio collar on, so that's how the Norwegians tracked him. It was quite interesting as he was so well-travelled, and we spent some time talking to the Norwegian researchers about the little fellow.

We also have a large population of arctic hares, lemmings, weasels, and lots of birds.

**K:** How do you get electrical service at the laboratory?

**P:** Our power is generated in Eureka by diesel generators. We have the world's longest extension cords, about 15 km of them. The cable is heavy duty and snakes along the ground from Eureka to our three research stations.

**K:** How do you obtain Internet access?

**P:** We have probably the world's most northerly geostationary satellite ground station. Even a few more kilometers north and you wouldn't be able to see geostationary satellites as they would be below our horizon. Anik F2 is about one degree above the horizon. We have to mount our satellite dishes upside



down as their mounting bracket doesn't allow them to be configured for 1 degree elevation.

Because of the low satellite elevation, we use what's called vertical diversity reception. The technique was developed for use in Eureka by a guy named John Strickland who works at the Department of National Defense. We have two dishes at different elevations above sea level. If the satellite signal fades on one of the dishes, then we can use the signal on the other dish.

Our Internet access is very expensive - we pay more per month than a household would pay in probably ten years.

**K:** You've been going north to Ellesmere since the 1990s. Have you noticed any changes in the climate during that time?

**P:** The terrain is definitely changing. The land is experiencing what we call "slumps". As the surface of the ground warms, ice under the surface melts. Then the overlying soil and rock slide away on this layer of water. This changes the look of the terrain. This year in the fall we are experiencing much warmer weather than normal for this time of year.

One thing I have noticed since 2005 is that in the summer we are getting a lot more rain. Even though it's summer, the rain freezes to form ice. The ice coats our antennas and instruments and causes a lot of damage. The last two years have been very bad in this regard.

The unusually high amount of summer rain also affects wildlife such as musk oxen. The rain freezes on the ground and this prevents them from being able to easily forage for food, as they can't break through the ice.

I asked one of the Inuit elders awhile back if they had noticed anything, and they said the same thing. Lots more rain, especially in the summer. We don't have any local indigenous communities, the furthest northern

community is in Grise Fjord about 400 km from the laboratory, but this is what they have observed.

**K:** What types of gear are you looking for to make VY0ERC more capable on the air?

**P:** We are hoping to put up a 40m "four square" antenna this fall. Verticals do quite well due to the "saltwater" effect. When the ionosphere is perturbed our predominant noise sources tend to be atmospheric and horizontal antennas tend to pick that up more than verticals.

We have a "GoFundMe" campaign to help us obtain new low band antennas, but we'd be happy for equipment donations as well of any type, especially to help us on the low bands.

**K:** Do you have any contact with the Canadian military base at Alert?

**P:** They are about two degrees (120 nautical miles) further north than we are. We have a microwave link to CFB Alert from Eureka. Alert is too far north to "see" any geostationary satellites like Anik F2, so the microwave link comes to us and we give them satellite connectivity because we can see the satellite. The military has a small contingent at Eureka in the summer as well. We help each other out with things like weather reports.

**K:** Is membership in the VY0ERC ham club limited to your operators and researchers?

**P:** No! Anyone that is interested in being associated with VY0ERC can be a member of the Eureka Amateur Radio Club. There are no dues, and all donations of either funding or equipment will be gratefully accepted. Readers can send us an email at [vy0erc@gmail.com](mailto:vy0erc@gmail.com) to sign up!

**K:** Thank you Pierre for a most interesting conversation!

~ Kevin VE7ZD/KN7Q

## VY0ERC Is Looking For Donations!

<https://www.qrz.com/db/VY0ERC>

From the VY0ERC GoFundMe page:

High Arctic weather is very challenging. Strong winds and icing disrupts the operations multiple times a year. The VY0ERC team is continuously rebuilding and improving the antennas in order to extend the operating time on the air and enhance the quality of QSOs. Far and away, the most consistent band VY0ERC operates is 20m. However taking into account the geographical location and current minimum of the solar cycle 40 and 80m becomes more attractive for DX contacts, especially from October to February during which time the Sun does not rise in Eureka.

"Do you need Zone 2 on 40 and 80m, do you need rare multiplier in the contest? VY0ERC would like to help you get it, but we need help establishing antennas that can reliably result in contacts! Our aim is to eventually arrive at phased vertical arrays for 40m and 80m. Please donate!"

<https://www.gofundme.com/f/vy0erc-on-40-and-80m>

Donations of money towards these goals, or even of station equipment would be much appreciated by Pierre VE3KTB and Alex VE1RUS, co-founders of VY0ERC. Equipment donations can be handled through Kevin VE7ZD, who will work with Pierre to get the gear up to Eureka for use by the club station.

# Amateur Radio Makes BC History

## Canadian National Parks On The Air In Fort Langley

Marcy Lui VE7JT & Fred Orsetti VE7IO



For the first time in history, Amateur Radio activated Fort Langley National Historic Site as part of the Canadian National Parks on the Air 2019 event.

### *How it began*

#### *CNPOTA Fort Langley National Historic Site BC12*

As an Amateur Radio Operator and a Fort Langley National Historic site volunteer, it has always been a dream for me to activate the “Fort” at Fort Langley B.C.

Early in my volunteer days with The Fort, I became aware of a WW Fort contest. I recall seeing listings for US and European Forts. What an opportunity to see the Fort activated, however this would have to wait for a future opportunity.

Fast forward to November 20, 2018 - receipt of RAC Bulletin Canadian National Parks of the Air 2019.

My reaction - YES, YES, YES my future opportunity has arrived!!

Within 2 days I emailed contact queries to fellow radio amateurs and clubs to see if there would be interest in activating the Fort. Replies indicated some interest so discussions got underway where Fred VE7IO volunteered to help with the scheduling and recruiting of ops and to work with myself and the Fort if needed. Now the approach to the Fort...

Although Parks Canada supports CNPOTA, many sites have no knowledge or experience with amateur radio, as this had never been done in Canada before. My goal was to ensure a total buy in, and smooth working partnership, between the Fort and amateur radio activators.

The goals:

1. Research a tie in between the HBC (Fort Langley was an HBC fort) and Amateur Radio (HBC operated Amateur Radio land based CZZL (Hudson's Bay Company at Gjoa Haven) and maritime (HBC vessel Fort Ross) stations)
2. To mitigate Fort activation concerns (impact to site, types of activator equipment & antennas brought on site, etc.)
3. Highlight increase amateur radio demographics visitation
4. Highlight promotion of Fort Langley NHS via Amateur radio ie: putting Fort Langley on the map with worldwide contacts.

The above goals were sent to the Fort management on November 26 and approval was received on January 2, 2019. Myself, VE7JT and Gord VE7GVB, also a Fort Langley NHS volunteer, would take the lead.

Work moved forward in multiple directions, special event call sign and, where and how activators would be set up. A site specific CNPOTA/Fort Langley NHS -BC12 guideline document was formatted setting parameters for activations. A Fort Langley site map designating 7 Fort approved activation



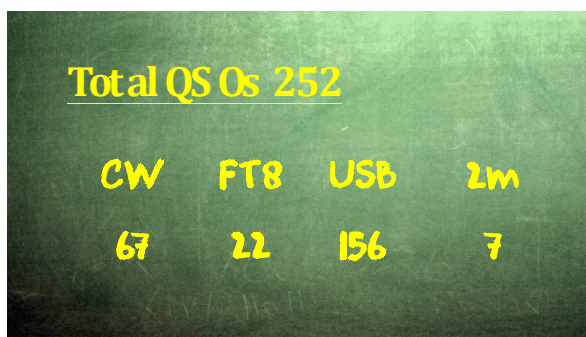


areas was drafted. The draft documents included consideration of single vehicle, smaller emergency trailers and field set ups with vertical, wire and mobile tower activations. The Fort suggested we provide signage, explaining our event, this showed their support for CNPOTA. The information signage would be placed in the Fort's Visitor's Centre during CNPOTA activations. The Fort Guideline docs were approved end of February.

Fred VE7IO and I discussed the possibility of a special event callsign for CNPOTA/Fort Langley, January 2019. I very much wanted to reactivate the historic HBC call sign CZ2L which was unavailable. The Amateur Radio Service Centre, Spectrum Management Operations Branch offered alternative callsigns for consideration. April 9 Fred VE7IO secured VC7FL special event call sign for CNPOTA/Fort Langley activations during the month of July and August - which became our focus.

With an operating schedule for July and August now in hand and using VC7FL Fred VE7IO actively recruited operators. The first activation was on July 6<sup>th</sup> with a two-person team, Christine VA7NLF fellow ham.

We had 5 activations of one day each by four different groups. Activations covered CW, SSB and FT8 with the following results:



<u>Total QSOs 252</u>			
CW	FT8	USB	2m
67	22	156	7



~ 73 Marcy VE7JT and Fred VE7IO

### The first team of Christine, VA7NLF and fellow Ham to activate Fort Langley BC12 with VC7FL

*We headed out with the car loaded up with our radio gear and ready to activate Fort Langley Historical Park, BC12, bright and early in the morning but Murphy's Law kicked in. After wrestling with some car troubles, we finally arrived onsite at Fort Langley. We were much later than expected and immediately began setting up our antennas and radios to be on the air. It was an overcast day, perfect temperature and fun to set up beside the imposing and impressive walls of the fort while enjoying staff and liaison contacts dressed in costumes of historic times. There are structured tents inside the fort where families can stay, and we had a number of people including a few children show a real interest as we set up the antenna and radio gear. We were QRV at 1845 UTC using special event call-sign VC7FL for the activation of CNPOTA BC12*

*The hardware setup was comprised of an MFJ-2286 kit raised on top of a tripod, a 16 foot telescopic mast connected to a LDG AT-100Pro2 tuner, Icom7000 @ 100W assisted by a battery power booster connected to a car battery. Also used was a Windows laptop running N1MM and WSJT combined with a Signal-Link USB sound card for the FT8 QSO's.*

*We first set up on 20m SSB. The band and noise floor was not working in our favor too much but we persisted and then eventually tried SSB on 40m for a bit, which seemed worse so QSY back to 20m and I did my best to pull out the contacts. We ended up staying later than originally planned and tried to make good use of the time to make as many QSOs as possible with the last couple hours spent making FT8 contacts on 20m.*

*Thanks to everyone for the support and making our CNPOTA 'a walk in the park'.*

*Christine, VA7NLF*





The first activation was quickly followed by a second activation on July 12th with operators Jeanne, VA7QD and Don, VE7DS.

Here is a brief report, starting with the most positive things first.

- It was a most enjoyable experience especially with the chance to operate with Jeanne again and to meet Marcy, VE7JT
- The detailed planning, documentation and onsite support given by Marcy was outstanding and made all the difference for us
- Despite very poor band conditions, Jeanne and I felt that we had done our best possible.
- We could do better next time - 2 hours were lost because I started assembling the Moxon incorrectly. It took 1 hour to discover this and another hour to fix it.
- The venue was electrically noisy , worse for ssb than cw
- We should have had separate rigs and antennas for ssb and cw, Much momentum was lost because of operator and mode changes, 45 Qs total

73 , Jeanne and Don



[top left] Don VE7DS (kneeling), Jeanne VA7QD (center) with Taylor (left) and Volunteer Graham (standing)

[bottom left] Don VE7DS, erecting the vertical while Graham looks on.

[top right] Hugh VE7YJ, Ralph VE7OM, Marcy VE7JT

[bottom right] Marcy VE7JT and Christine VA7NLF





On July 13<sup>th</sup> the third activation to place with White Rock ARC members Ralph, VE7OM, Eric, VA7NX, Hugh, VE7YJ and Bill, VE7WNO.

The White Rock Amateur Radio Club participated in the activation of Fort Langley National Park on two occasions. Firstly on July 13 when Ralph, VE7OM; Eric, VA7NX; Bill, VE7WNO; and Hugh, VE7YJ set up inside the fort and operated on 20 meters CW and SSB as well as 2meters, making a total of 37 contacts on those bands. It was a contest weekend, so the bands were very busy. Ralph and Hugh returned on August 14 and using the Surrey ARC mobile tower and tri-band beam. The bands were fairly quiet that day, but still managed 9 contacts in the three hours of battery operation.

It was an enjoyable experience to go to this national park, meet a number of the members of the public where we could explain our hobby and the activity we were participating in.

73, The White Rock ARC



[above left] The SARC 110ft mobile tower

[above right] The SEPAR Trailer

[top right] L -R Eric VA7NX, Hugh VE7YJ,  
Back L-R Marcy VE7JT, Bill VE7WNO, Elise, Chloe, Gord VE7GVB

[centre right] Eric, VA7NX

[bottom right] L -R Eric VA7NX, Bill VE7WNO, Marcy VE7JT,  
Gord VE7GVB, Ralph VE7OM





### August 10<sup>th</sup> Marcy VE7JT & Gord VE7GVB

We were up and running 9:54am and stood down at 2:55pm.

In the middle of a contact, the generator ran out of gas and abruptly shut down our radio equipment. My apologies to the ham I was working. Refueled we continued operations. We were dealing with a very high noise level at the start of the activation S10, however conditions changed and we had comments later- we were the strongest signal on 20m. . We logged 120 contacts, one of which was VHF. I was very pleased to work Mexico and Hawaii. Gord noted he worked the Los Angeles Maritime Museum (LMM). Many thanks to SARC (Surrey Amateur Radio Club) for the use of the SARC tower/TH7 which made our activation a great success.



[top left] Marcy VE7JT

{bottom left} Gord VE7GVB

[right] Hugh, VE7YJ Ralph  
VE7OM on August 14<sup>th</sup>



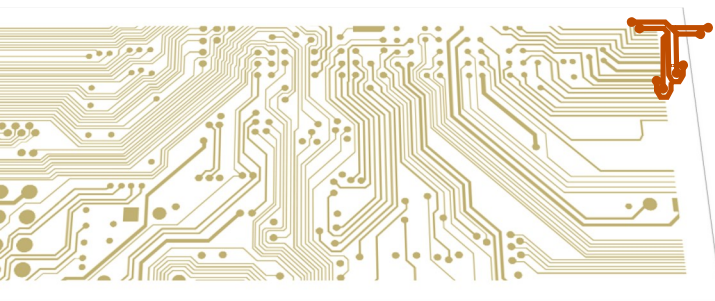
Thanks to all the amateur radio operators who activated the Fort Langley Historic fort, CNPOTA BC12. Operations were varied with portable antennas to a multi-band beam with a mobile tower trailer. The tower was loaned to CNPOTA BC12 by the Surrey ARC and we thank the club and members for their valued contribution. Also thanks to the Surrey Emergency Program Amateur Radio (SEPAR) for the use of their communications trailer. Thanks to everyone who worked us and uploaded their log to CNPOTA.

Fort Langley staff shows the QSL card for Donald Graham VE5LD. HBC Apprentice Clerk Donald Graham VE5LD operated Amateur Radio land based (HBC radio station at Gjoa Haven, in Canada's Arctic, call sign CZ2L, from 1935-1938) and maritime HBC vessel Fort Ross (1939-1941).

[right] Shirley with HBC Post call sign CZ2L/VE5LD







# TECH TOPICS

*John Schouten VE7TI*

## **Rotor-EZ for Hy-Gain Rotator Control**

This article describes my experience with the “Point and Shoot” Rotor-EZ, available with or without computer control RS-232, and the Rotor-EZ Serial Upgrade Kit (non RS-232 to RS-232) for Hy-Gain Controllers by Ham Supply/Idiom Press.

The kit I purchased offers a ‘Hands-Free’ Rotor-EZ controller that installs in any CDE, Ham-M, Ham-II, Ham III, Ham IV or TailTwister rotator control box with three paddles. You have 3 paddles on your Hy-Gain box? The Rotor-EZ will work for you!

The manufacturer’s website <https://www.hamsupply.com/rotor-ez-hy-gain-rotor-control/> states that: “if you own one or more of these listed rotators, you know that for all their faults they are still some of the best rotators available. Now, by adding Rotor-EZ to your rotator control, you can bring these units up to date with all the features of rotators or rotator controls costing hundreds of dollars more, all while eliminating the faults!

Rotor-EZ starts by adding a really neat and unique auto-point feature, which is easier to use and more accurate than the “preset” capability offered by any competitive rotator or rotator control. This allows you to quickly, simply and accurately point the antenna, then press the brake paddle momentarily and let go, freeing your hands for other things, perhaps such as a

panic band change thanks to a packet spot called in for a needed station.

Rotor-EZ protects your rotator, with electronic end stops, provision for coasting, and start-up jam prevention, which is especially useful for TailTwisters. You lose no utility with these features, but add significant protection for your rotator, antenna and tower. These features can be bypassed if desired.

Rotor-EZ also offers full support for antennas set at 90° to the main antenna. Ground a circuit lead and the meter needle moves 90 degrees to show the bearing for the offset antenna. And, an LED lamp pulses to remind you that you are in the offset mode. Perfect for the forty meter “shorty-forty” or the WARC band offset antenna sharing the mast with your tri- bander!

Full RS232 control is now an affordable option for older Rotor-EZ installations with the Rotor-EZ Serial Upgrade Kit (non RS-232 to RS-232), offering full compatibility with all the popular logging and contesting programs.

Rotor-EZ is offered as a circuit board kit or a prewired and tested board that you add to your rotator control unit. Everything needed except solder and tools is included. Featuring sophisticated micro circuitry and firmware, the board can be assembled and installed in a few hours. All functions are accomplished in the



control unit, and no tower climbing is required to fully implement Rotor-EZ. The board fits in and works with all CDE, Ham-M, Ham-II, Ham III, Ham IV or TailTwister rotator control units that have three control paddles on the front. If you do not have the time to add Rotor-EZ to your rotator, contract assembly and installation are available.

### Operating Modes

**Manual Mode:** The rotator control works as before; pressing the brake and a paddle turns the antenna. However, Rotor-EZ provides an automatic 5 second time delay before the brake resets after paddle release, allowing the antenna to stabilize before the brake locks (note that after Rotor-EZ is installed, the LED's - if supplied in the original configuration of the box - do not light when the unit is manually controlled, although the meter functions as before. However, normal operation using Rotor-EZ will rarely require manual operation, and when using the Rotor-EZ features, the LED's do illuminate as appropriate).

**Auto-Point Mode:** What was the calibration knob becomes your pointing control (the calibration function is now an internal one). When you turn the knob, the meter function automatically switches from reading the existing antenna bearing and instead becomes the aiming pointer, captured by the aiming logic of the circuit. Rotate the knob, moving the needle easily, precisely and accurately to your desired bearing. Then, a brief press of the brake paddle begins rotation, and your hands are free! The meter needle returns to its normal function, tracking the antenna as it moves. When the antenna reaches the new bearing, rotation stops, and after a 5 second delay the brake sets. LED's signal the motion, and how near the antenna is to the new bearing.

If the TailTwister program option is selected (all program options are selected by PC board jumpers), when command execution begins the rotator first pulses in the opposite direction for 1 second in case the brake is stuck, pauses

1 second, then turns in the proper direction. This routine virtually ends Tailtwister start jams. If the antenna still does not move within a few seconds, an LED signals a rotation problem and the rotation command is cancelled.

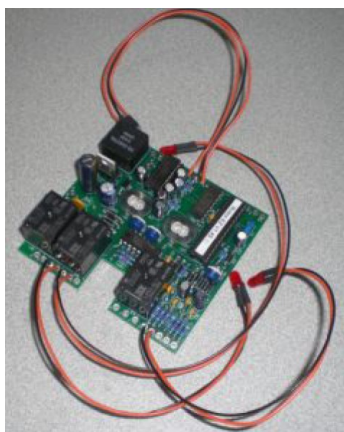
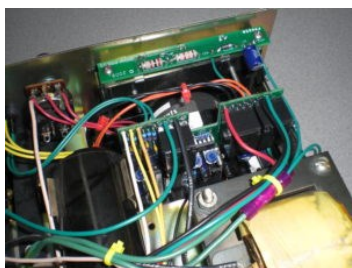
Another program option adds electronic end points. If enabled, this Rotor-EZ option limits the rotation range to exclude the last 5 degrees on either end of the scale, preventing the rotator from jamming on the end stop. The rotator can still be manually turned into these areas if needed.

*Rotor-EZ in Action on YouTube* <https://youtu.be/vlCwOx4cWFg>

**90-Degree Offset Capability:** Now standard in all units. When active, the offset moves the meter needle 90° right or left, supporting the offset antenna. The plus or minus offset is controlled by a circuit board jumper. Grounding a circuit board lead, either by a switch added to the control box or by an external control such as a set of relay contacts, activates the offset capability. While active, an LED blinks to assure recognition by the operator that the control is in offset mode (this notice can prevent some stupid mistakes of the type that tend to occur at 2 AM). The 90° offset capability is fully supported in each of the three modes (manual, auto-point and RS-232).

**What differences will Rotor-EZ make to your operating?** Active operators using Rotor-EZ tell us that they use their rotators a good deal more because of the greatly enhanced convenience. Checking out long path, looking down secondary propagation paths, or testing for crooked path signals are all easier.

Also, they find themselves tuning different bands more frequently, because turning the antenna for the optimum path on a different antenna is so easy and painless. In short, they wonder how they ever got along without it! You will too!



**RS-232 Mode:** RS-232 is now an option for older Rotor-EZ installations by adding a computer interface to the circuit board. With the RS-232 Rotor-EZ Serial Upgrade Kit, Rotor-EZ works with any logging or contest program that recognizes the Idiom Press Rotor-EZ protocol or the Hy-Gain DCU-1 protocol (the DCU-protocol doesn't allow the current bearing of the rotator to be read, however). A nine pin DB9 RS232 serial port connector offers access to your computer.

#### For Rotor-EZ with RS-232

No DB9 RS-232 port on your computer? Did you know all you need to run Rotor-EZ (with RS-232) from a USB port on your Windows 98/XP/98SE/ME/2000/Vista/Win7/Win8/Win10/RT or Apple Mac OS X is a quality USB to RS-232 adapter cable (<http://ham-supply.highwire.com/product/usb-to-rs232-converter>)? As to why they've made the decision to stick with tried and true RS-232 on their controllers and not go the path of direct USB to USB connectivity, here's just a few of their reasons:

- RS-232 dependability, stability
- RS-232 compatibility with older computers
- RS-232 ease of use - lack of intensive USB software stack (the deltas blog (<http://deltas.blog.com/2012/11/28/usb-vs-rs-232/>))
- Hard limitations on cable length for USB (1.5-2 Meters) versus up to 15 Meters (maximum baud rate) and 100 Meters (low baud rate) for RS-232
- RS-232 - dedicated communications (COM) port - unlike USB "hubs" with complex stacks to identify and separate ever changing ports

They also write that it is worth pointing out that RS232 is far superior to USB when jitter and latency matter. You cannot reliably feed a Pulse Per Second signal to a computer over USB. You can do so with RS232" - dfc (Electrical Engineering, <http://www.stackexchange.com>)

And the list goes on and on. USB may be great for your computer peripherals like a camera or a high speed printer, but for low baud, rock solid communications, they claim that RS-232 is still the king. The manufacturer recently spoke to an employee/engineer of a well known Ham Radio antenna company that is presently looking into re-implementing RS-232 for their products because they've had so many issues with direct USB to USB connectivity. The bottom line is, "the newest thing is not always the best thing".

**How is the kit?** Having built the kit several years ago and using it successfully on my Hy-gain controller since that time, I offer the following comments and photos.

The kit was a breeze to build. The circuit board was well manufactured and the accompanying instructions clear and well-written. Component quality was good as well. The process of wiring the Rotor-EZ board into my controller took a bit of time, but again, the steps are well documented. I took great care in assembly to ensure the final result was reliable and inobtrusive... and it is. It is really only when you use it that the results become apparent.

## Features

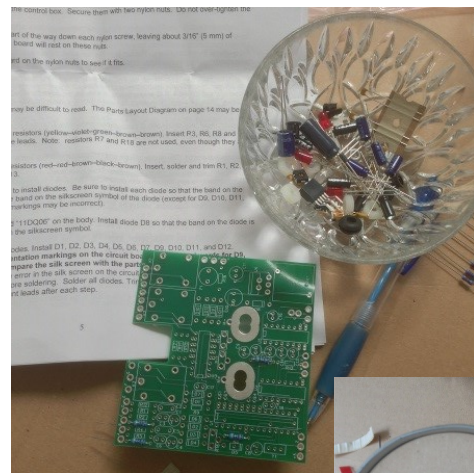
- 5 second delay before releasing brake after any operation
- Really slick "auto-point" feature
- Full manual override always available
- Algorithms to deal with pot strip "dead spots"
- Control Accuracy: better than 3°
- Programmable anti-stick routine
- Programmable electronic end points
- Programmable overshoot option for large arrays
- Full 90° offset support for secondary antennas
- LED's give brake and rotational status
- RS-232 support optional, commands compatible with HyGain DCU-1 control
- 90 day warranty on parts; repair service and installation service available
- Patented US Patent Office
- Works with CDE-45, Ham-M, Ham-II, Ham III, Ham IV and all TailTwister rotators
- Installs in any CDE, Ham-M, Ham-II, Ham III, Ham IV or TailTwister rotator control box with three paddles on the rotator control box.



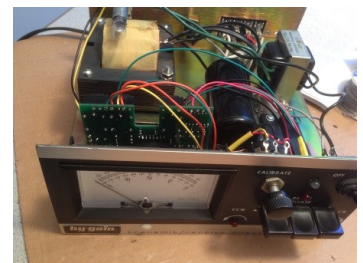
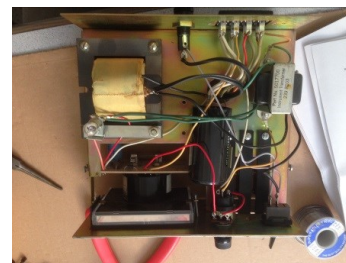
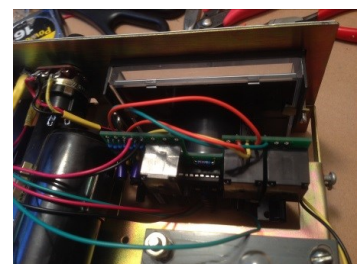
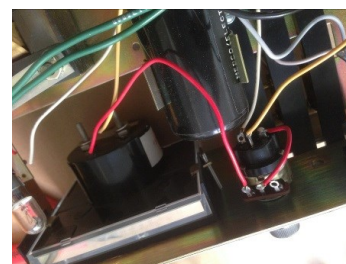
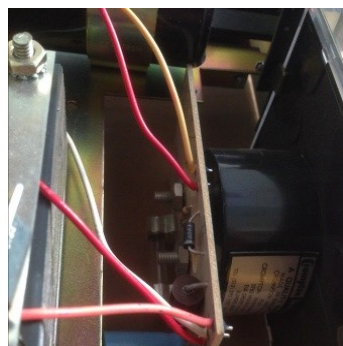
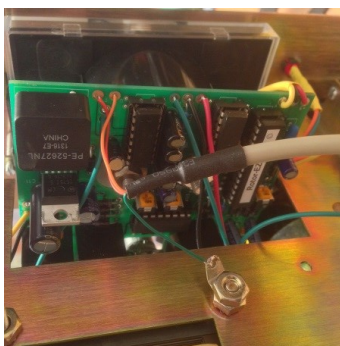
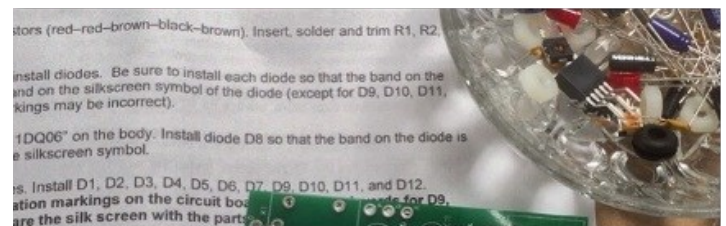
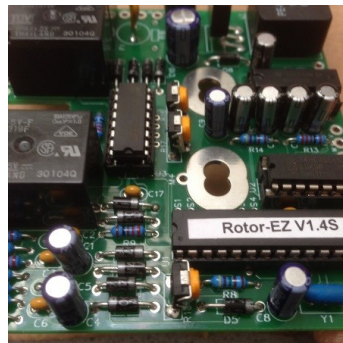
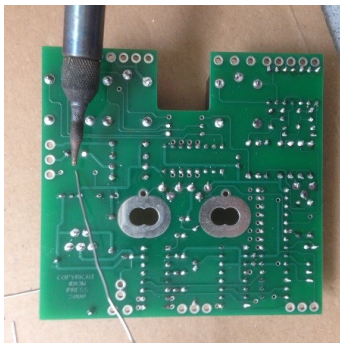
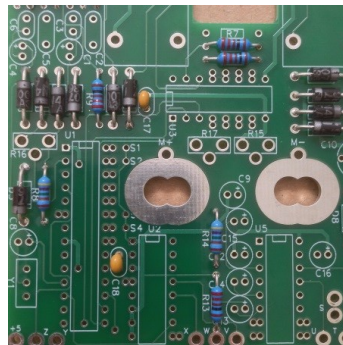
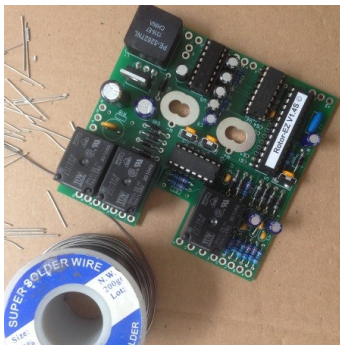
I also invested the few extra dollars in the RS-232 model, and I'm glad I did. It works like a charm. If I find a 'spot' for DX that I want to work, it is really a matter of only selecting the spot in N1MM or using dedicated software to point the beam.

There are other, similar products on the market so I spent time researching them and reading the reviews. I'm pleased with the selection I made.

~ John VE7TI



*This is not SMT construction but some of the parts are minute. It took a magnifying glass to identify the marked values on some components*



# The Contest Contender

John Brodie VA7XB

## CQ Worldwide CW DX Contest



As a result of a forced move to new premises, our Operations and training Centre (OTC) has been unavailable since mid-summer so an opportunity for good contesting was overdue. John VA7XB offered to host the CQ WW DX Contest (CW) on Nov 23-24 at his QTH. To make this possible, the Executive authorized some of SARC's equipment to be used temporarily at John's station until such time as radios and antennas could be installed at our new venue.

Once set up and tested at John's QTH, the equipment plus N1MM+ Logger all worked well together, with no hiccups or unpleasant surprises. We operated as VE7SAR in the category Multi operator-one radio high power.

Over the course of 48 hours, four CW operators (Slawa VE7LWW, Jan VA7VJ, Les VA7OM and John VA7XB) made 1156 confirmed contacts on 80, 40, 20 and 15m, with a final claimed score of 532,848. As good as this score was for us, we did not place very high on the overall standing in our category. The advantage these days of poor propagation goes to east coast stations which have only one or two hops eastwards over the Atlantic to Europe whereas our propagation to EU is northerly over the Pole where we have to contend with flutter and fading. Nevertheless, the west coast has the advantage

working into the South Pacific and Asia. Despite zero sunspots and the expectation of poor worldwide propagation, the availability of DX was quite amazing.

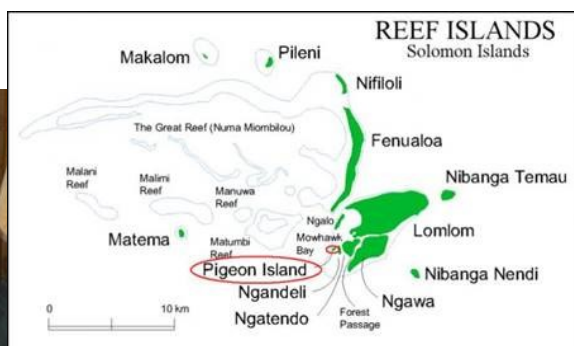
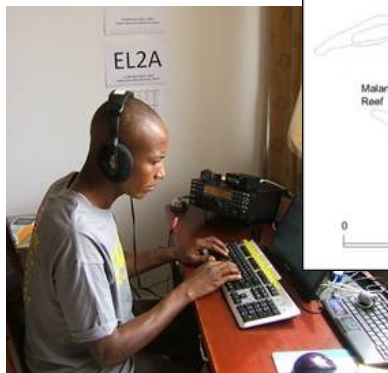
Propagation in the early morning hours to Indonesia, Vietnam, Brunei and Malaysia was especially good on 80 and 40 m, as were Australia and New Zealand and other Pacific islands. During the afternoon, Japan, China, South Korea, the Caribbean and South America were well represented on all bands as is normal for these contests, but Russian and other central Asian stations were few and far between. As always a strong presence from JA-land gave us numerous contact points to bring up the score.

Openings into Europe were present mostly on 20 m during the late morning of both Saturday and Sunday, but the strongest signals were from western Europe (Spain and Portugal) and the Mediterranean, with central EU mostly absent.

Contacts were made with stations in northern and western Africa including Morocco, the Islands of Madeira, Azores, Cape Verde, St Helena and Canary as well as Namibia (V55A) the Gambia (C56XA), Senegal (6W7PCT and 6V7A), Liberia (EL2DT) and as far south as South Africa (ZS2NF).







As usual, 20 m was the band responsible for the majority of contacts, but 40 and 80 m provided plenty of DX surprises.

We came away very satisfied that there is no place in the world out of reach of our equipment, which proved capable of breaking through virtually any pileup given a modicum of patience.



## Do you need an 'Elmer'? We Will Help

As noted at the last general meeting, SARC prides itself on bringing new members into the world of ham radio and helping them get started. We do this by offering ham classes, workshops and technical talks at our monthly meetings and articles in the bi-monthly Communicator. Perhaps we need to do more and here is a suggestion that was supported by the members present.

Whereas, new members seek out those persons who might offer assistance, sometimes it is not obvious whom to ask. Therefore we need to develop and promote a list of members who are willing to provide help, i.e. be an "Elmer" (for those new to amateur radio, an "Elmer" is a

knowledgeable person who is willing and capable of mentoring a newbie).

The Elmer's group would be established and publicized on SARC's website so that members know how to identify the go-to person for their particular interest.

So far, we have the following members who have agreed to be official "Elmers": John VA7TI, Stan VA7NF, Rob VE7CZV, Kevin VE7ZD and John VA7XB.

Who else is out there that would like to volunteer to share their expertise? Please let me know.

~ John VA7XB





# SOLDER SPLATTER

Daniel Romila VE7LCC

## Trying To Use A 3-pin Radio IC For Hams

Browsing the Internet for ideas, I found many people enthusiastic about 3-pin integrated circuit radios.

I am talking about MK484, a newer version of the old (born sometime around 1970) ZN414. There is even a newer version, TA7642. They look like they have the same internal schematic.

The main difference between the TA7642 datasheet versus the previous versions is that the maximum working frequency is no longer declared. The older versions were declared as OK up to 3 MHz. This was already a bad sign about the use of this IC for ham radio purposes. But I successfully received even 8 MHz modulated with 1 KHz with the TA7642. I cannot say how much sensitivity was still left at 8 MHz, just that it worked.

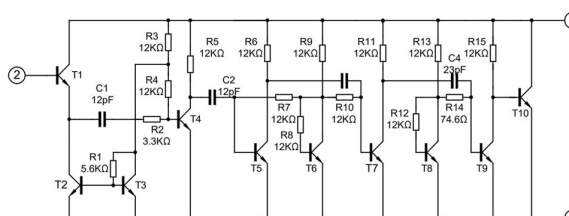
The IC is a simple AM receiver with amplification and detection. That means one single inductor would be enough to put this radio in operation. The traditional schematic implementation, given in the datasheet, is shown on the right.

As it is possible to see in the application circuit, the variable capacitor is not connected to ground. This is not something that I wanted to have, especially in a ham radio receiver. So I went back to the test circuit and decided to add a FET in front the transistor.

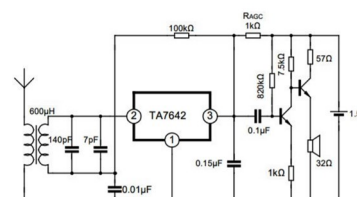
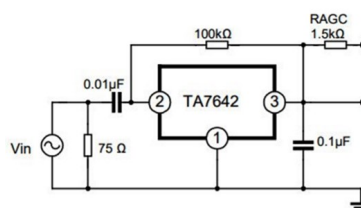
The schematics with which I played to verify the capabilities of TA7642 and its eventual use for ham radio is shown lower right.

What I did was to use the FET as repeater. While apparently this loses some signal, actually it made the signal a little stronger, due to the high impedance seen now by the inductor. I used a 470 uH molded inductor, which has a

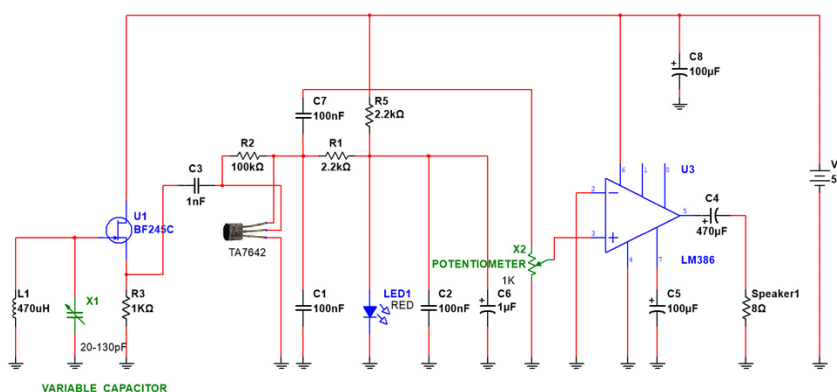
### TA7642

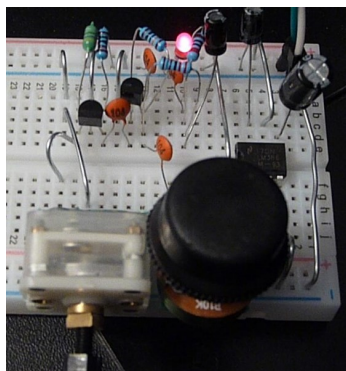


Pin no.	Symbol	Desc.
1	Vss	Gnd
2	I/P	Input
3	O/P	Output



The test circuit [left] and application circuit [right]





ferrite perfectly fine for medium waves. I also tried with normal MW/LW dedicated inductors on big ferrites, salvaged from old radios. It made absolutely no difference. Probably the MW signals in my place are so strong that the size of the ferrite does not matter anymore. The use of this repeater arrangement also allowed me to have the variable capacitor with a terminal at the ground.

My attempts to make BF245 to amplify when power supplied from 5V were futile in practice, so I went into a computer simulation, which also confirmed BF245 does not really amplify when it does not have enough voltage between drain and source.

I decided to use 5 V power supply because TA7642 wants a very small voltage, which is around 1.76 V, dictated by a red LED. The very criticized LM386 was used as audio. Its native 20 X amplification is enough for AM on medium waves. I managed to put everything neat on a breadboard as shown top left.

You can see it in operation at:

<https://www.youtube.com/watch?v=vMCvm132ae8>

A higher resolution schematic can be downloaded from my github: <https://github.com/danielromila/Rx-with-TA7642>

The selectivity is still bad. In order for this radio IC to have any use in ham radio application would require some SSB demodulation capability, or at least some regeneration method. I found on the Internet several versions of adding regeneration. They do not work. Period. They are just a proof that any amplifier can be forced to self oscillate. Some people even tried external multiQ circuits. Why should I put a radio IC if in the end I use it a a single transistor, and an incredibly bad one, with some 40% distortion in regenerative schematics? This IC was designed with a 0.1 uF decoupling capacitor in its output (yes, to the ground - and from the same output the audio gets out, through another 0.1 uF capacitor. It is simple to have just 3 pins, but also a limitation when somebody wants to play outside the original specs.

My conclusion is that - unfortunately - those 3 pins radio ICs are just toys. They are not useful for ham radio. One must be very desperate to use it.

~ Daniel VE7LCG

## RF-Seismograph Gets Traction

Alex Schwarz, VE7DXW, has theorized for some time now that his RF-Seismograph (and presented at a [previous SARC meeting](#)), initially aimed at indicating band openings, seemed to also act as a real seismograph of sorts, with effects of earthquakes affecting HF noise levels and actually briefly enhancing HF propagation. Schwarz has some support from Professor Kosuke Heki of Hokkaido University in Japan, who has been researching whether changes occur in the ionosphere as a result of an earthquake.

The work of both citizen scientist Schwarz and space geodesy expert Heki is noted in a [November 12 Hackaday article](#), "HF Propagation and Earthquakes," outlining the observations of both men. According to the article, Heki "knew that changes in the ionosphere can affect GPS and GNSS receivers on the ground, and with Japan's vast network of receivers to keep track of the smallest of movements of the Earth's crust, he was able to spot

an anomalous buildup of electrons directly above the devastating 2011 Tohoku-Oki earthquake that preceded the earthquake by 40 minutes."

Heki's theory is along these lines: Chemical bonds in the rock, specifically peroxy bonds between two oxygen atoms, are broken by microfractures, leaving one side of the peroxy bond with excess electrons and the other with a positive hole. "These holes tend to migrate from high stress to unstressed areas of the rock, which leads them to eventually reach the surface, leaving it with a net positive charge," the Hackaday piece says. "As stress in the rock below increases, the number of positive holes reaching the surface rapidly multiplies, drawing electrons from the atmosphere to balance the charge. The moving charges generate an enormous electromagnetic field that can reach all the way up to the ionosphere, creating just the kind of anomalies that Professor Heki observed."

~ Hackaday

# A Longer Wait For Solar Cycle 25

Solar activity has a cycle of approximately 11 years. During this period, sunspot activity rises to a peak and gradually falls again to a low level. An international panel of scientists co-chaired by NOAA and NASA release reports every few months on the state of the sunspot cycle. This is probably the most accurate source in terms of what is likely to happen.

Current Sunspot Cycle 24 gave a smoothed sunspot number maximum of about 69 in the late Summer of 2013. The smoothed sunspot number reached 68.9 in August 2013, the official maximum. Now, at the start of 2020 we should be at or near the bottom and it is hoped things will start to improve. We are currently seven years into Cycle 24. The current predicted and observed size makes this the smallest sunspot cycle since Cycle 14 which had a maximum of 64.2 in February of 1906.

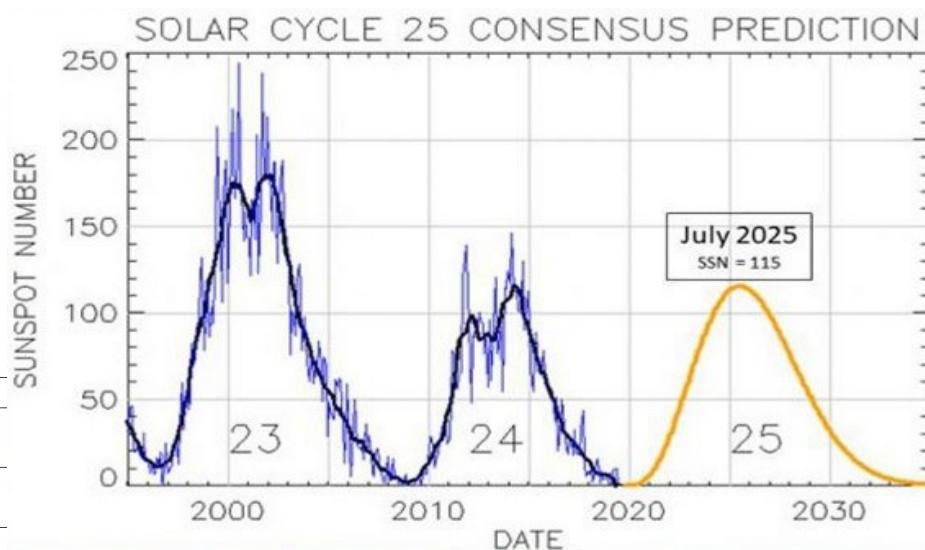
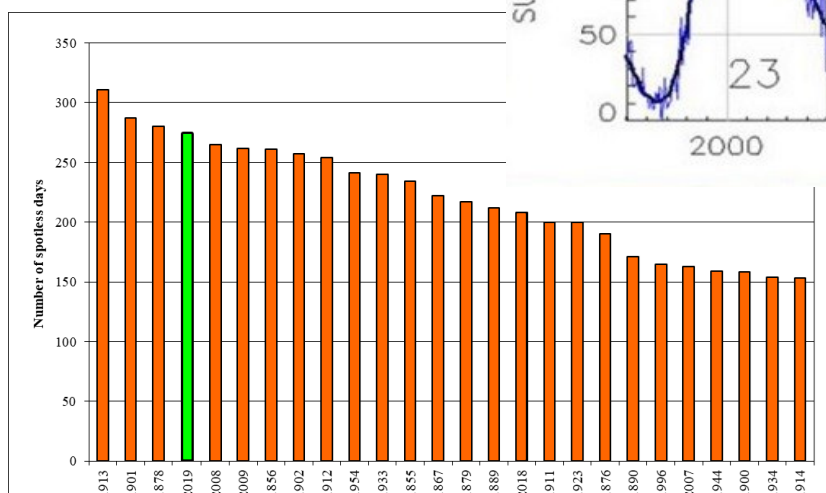
Back in April of 2019, the previous report predicted that the solar minimum would likely happen between July 2019 and September 2020. In the most recent report dated December 2019, they are predicting that the minimum has been pushed back. They predict that it will now occur sometime between

November 2019 and October 2020. But, on December 24th, there were indications that Solar Cycle 25 really is coming. For the first time, there were two new-cycle sunspots on the solar disk, one in each hemisphere. We know these sunspots belong to the next solar cycle because of their magnetic polarity. Simply put, they are backwards. According to Hale's Law, sunspot polarities flip-flop from one solar cycle to the next. During old Solar Cycle 24, we grew accustomed to sunspots in the sun's southern hemisphere having a -/+ pattern. Now it is the opposite: +/- . This identifies it as a member of new Solar Cycle 25. This northern sunspot has a reversed polarity compared to northern spots from old Solar Cycle 24. It too, therefore, belongs to Solar Cycle 25. As for the upcoming Solar Cycle 25, they are still predicting that it will be similar in intensity to the last solar cycle with a smoothed sunspot number (SSN) of 115. The peak is predicted to occur between November 2024 and March 2026.

It looks like 2019 will end the year with more days without Sunspots than any year since 1913. Space weather reported on December 17 there have been 34 consecutive days without Sunspots and a total of 271 spotless days in 2019.

*Solar Cycle 25 will have a peak SSN of 115 ( $\pm 10$ ) in July 2025. Solar Cycle 24/25 minimum may occur in April 2020 ( $\pm 6$  months).*

*Below: Number of sunspot free days per year*



Space Weather <https://spaceweather.com/>



# Radio-Active

## Profiles of SARC Contacts

John Brodie VA7XB



Barry Nugent ZS2NF

*After our contact with Barry ZS2NF during the CQ WW DX CW contest in November 2019, I discovered that he had an interesting life in South Africa. At my suggestion, he offered this bio for those of us who enjoy learning about the experiences of our fellow amateurs in exotic locations around the world.*

~ VA7XB


I was born in 1952 in what is now Zimbabwe (Harare the capital city). My father (Patrick) had always been involved in radio since the early 1930s but was never licenced, although he had before the war worked closely with a famous Cape Town ham named Henry Reider (ZS1P) developing VHF "walkie-talkies" on the 5 metre band. Henry was one of the first people to receive TV signals in Cape Town from the UK TV broadcasts after the war and for a time held the world DX record for 6 metres in the 1950s. This must have rubbed off on me as there is a photo of me at age about 6 using a regenerative broadcast receiver made for me by one of my father's apprentices.

The family moved to South Africa in January 1965 and I finished my schooling in Pietermaritzburg (province of Natal ZS5). My first ARRL handbook was the 1965 edition (I still have it!) and this I guess really started my ham radio career. I had however to wait until I turned 16 years old before I could get a licence. This was done as soon as possible and I was licenced as ZS5NF in January 1969. I built a small 80m


crystal-controlled TX using a 6L6 output tube and had my first QSO with a school friend across town who had also become licenced at the same time. I built a 16 tube double-conversion HF receiver with only a grid dip oscillator and a multimeter for test gear. How it managed to work is a miracle but it served me well for quite a few years. I was then donated a 100 watt TX by a local Elmer from the Pietermaritzburg branch of the SARL. It used a 4D32 output tube with a Geloso VFO and a pair of 807s modulator and it changed my life as far as DX was concerned! By the way there are 16 letters in the QTH of Pietermaritzburg! Can you imagine how long my QSOs took to complete! I don't know of any other town in ZS that has as many.

I spent 1970 doing my compulsory military service in the Signals Corps where my ability with Morse Code was somewhat in demand. I started university in 1971 and took a 4 year degree in Physics. After this I joined the South African Antarctic

# ZS2NF



CQ Zone 38



Barry J Nugent  
P O Box 17  
Uniondale, 6460  
SOUTH AFRICA

ITU Zone 57

Grid: KF16ni

To Radio	Date	UTC	MHz	Mode	RST
VE7SAR	23 Nov 2019	1743	14	CW	599

Thanks for the QSO!
Pse QSL Tks

Expedition of 1976 and spent the year at the SANAE research base on the ice shelf 70 odd degrees south and operating as ZS1ANT while there. I was running a data gathering program focussed on the Aurora, magnetic micropulsations and whistling atmospherics. We dug a lot of snow, drank a lot of coffee and watched a lot of movies (16mm films!).

After my return, I joined an electronics company in Durban and spent many years working on mostly RF development and then got into thick film microelectronics where we made circuit boards on ceramic with printed resistors and conductors. I was not really active in ham radio during most of this time. I married Colleen (a music student met while at university) in 1979 and we have two children, a son Daniel born in 1981 and a daughter, Rosemary born in 1983. Both of them are now living in Cape Town. In 1987 we moved to Cape Town where I joined Plessey. My callsign became ZS1NF and again I was not very active what with work and family commitments.

In 2003 I started my own small business making various electronic and mechanical components. We had always wanted to move out to the country and in 2007 bought a small holding here in Uniondale in the little karroo (a kind of semi-desert environment much like Arizona or New Mexico). It is 3 acres in extent and is sufficiently far from the municipal authorities that they don't seem to mind me putting up a few 65 ft pole masts! We built a house in 2008 and have been here in the "boondocks" for these last years. In 2007 my callsign changed to ZS2NF. I have now started to get back into ham radio a bit more seriously and enjoy working contests (especially the ARRL ones). I love the CW contests especially (I'm not really that good at Morse but with N1MM to do all the logging and sending it sure makes it easier).

I have had time to experiment with a few antennas here and have put in a pair of 65 ft pole masts oriented at right angles to the North American direction. The antenna I use on 40m at the moment is a pair of MOXON rectangles spaced about 5/8 wavelength horizontally at about 60 feet up and fed in phase for the short path to north America. It really works well! It is a cheap antenna to make as I have used stranded galvanised electric fence wire for the elements, RG6 TV feedline for the feed (I use a pair of full wavelength feeders so as to reflect the 50 ohm feedpoint impedance at the joining point to make 25 ohm then there is a quarter wavelength of parallel 75 ohm coax to make a transformer back to 50 ohms at the feedpoint where it's 50 ohm coax all the way to the shack). I have broken all the rules using the wrong materials etc but believe me it really works!

On 20m I have a full size 4-el yagi designed straight out of the ARRL antenna book at 65 ft on one of the poles. It is a beautiful antenna with a really crisp pattern. On 15 m I have a similar yagi but only 3-el although it seems to be

OK. For 10m (if it ever comes back again!) I have a G3KSC designed OWA 5 el yagi.

For the CQ WW I put up a 270 ft centre-fed Zepp with a 70m 450 ohm homemade open wire line for 80m and 160m. I borrowed an MFJ 986 tuner from Nick ZS1ZD (a new mover to Uniondale from Cape Town) and it tuned up pretty well but the open wire line was too close to the inside of the shack so I had lots of trouble with RFI and my computer, which is something I need to sort out for the next contest.

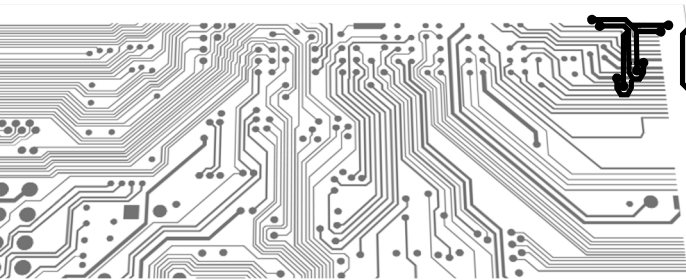
I made 844 QSOs in the 2019 CQWW CW test for a score of 536,858 on 80, 40, 20 and 15 m. I was very impressed with the large number of west African stations from zone 35 that were on. This was a nice change from my point of view!

I never use an amplifier and always run 100 watts on all bands. I currently use an ICOM 736 but have recently purchased an FT1000MP Mk5 which can do 200 watts so maybe this time in the ARRL I'll crank it up to 150 watts for the contest. I do have quite a lot of older tube type gear which I started collecting a few years ago. Collins KWM2-A, Hallicrafters HT37 and SX111, National NC 300, National HRO "Sixty" and a Yaesu FL1000B which I don't use. Most of this stuff has seen better days and is in need of restoration.

It was great to work the VE7SAR club station. Thanks again!

~ Barry ZS2NF





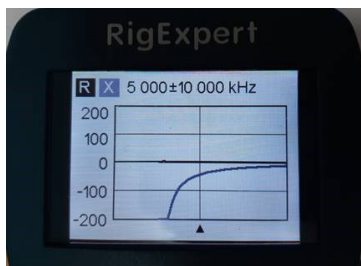
# TECH TOPICS

John Brodie VA7XB

## Nifty Features of the AA-600 Antenna Analyzer



Wood or plastic clothes peg holds the component in place



The trace shows 2 curves: R is flat at approx. zero. X varies between a very low value and the asymptote at 0.

Many of us have used SARC's RigExpert AA-600 antenna analyzer for tuning antennas at Field Day or at the OTC. It's a terrific device- accurate, versatile, user-friendly and proven immune to interfering signals on nearby frequencies. Years ago this quality of instrument would only be found in the form of lab grade devices at unaffordable prices. Yet, most of what we describe below can also be done on other high quality, modern analyzers in the same price range.

Of course, the most common use of the antenna analyzer is for measuring SWR and the reactive components of impedance, but it has many other uses, e.g. tuning resonant circuits, determining feedline characteristics and measuring component values. Although everything is explained in the well-written user's manual, we will describe one of its nifty features in this article.

### Measuring Capacitance and Inductance of Discrete Components

In the construction of radio equipment, especially when using junk-box items, occasionally the value of a component will not be known, or you may simply wish to confirm its stated value. If so, you can use the AA-600 for measuring capacitance from a few pF to 0.1µF. Ditto, inductance from a few nH to about 100 µH. Here's how:

The component to be measured is inserted into the N-connector socket of the AA-600. A non-conducting wood or plastic clothes peg serves to hold one of the component leads tightly to the grounded side of the connector while the other lead is inserted into the centre pin, as shown in the photo.

First recall that capacitive reactance ( $X_C$ ) and inductive reactance ( $X_L$ ) are conventionally expressed as negative and positive values, respectively.

### Capacitance

This particular capacitor under test is stated to be 750 pF ±5%. Therefore we would expect the measured value to be between 712 and 787 pF. Let's see if it is.

The procedure to measure capacitance is to first scan the R and X values across a range of frequencies, identify the approximate frequency at which the  $X_C$  is between -20 and -100 Ω, then read on the instrument its equivalent value of capacitance at that frequency:

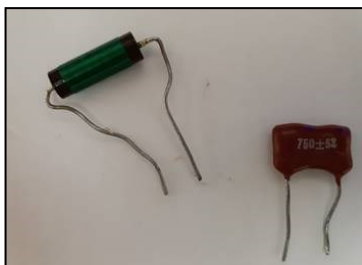
Enter the R,X graph mode by pressing key 5, select a scanning range and perform the scan. The graph should look something like that shown here, with the R trace near 0 over the entire range, and  $X_C$  increasing gradually from a negative value to near zero at the higher end of the range. If it does not, change the centre frequency and range, and re-do the scan.



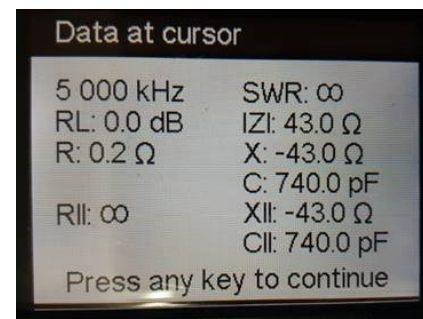
By using left and right arrow keys, scroll to the frequency where X is between -25 and -100  $\Omega$ .

Switch to the "data at cursor" mode by pressing the function key and 1 button together. Read the value of capacitance or inductance.

In theory, this should give similar results at any frequency, however, the stray inductance of the capacitor leads (and the stray capacitance when measuring inductance) will introduce errors if an inappropriate frequency is selected. That is why the most reliable result is obtained when  $X_c$  is between -25 and -100  $\Omega$ .



*An inductor (coil or choke) and mica capacitor of unknown or uncertain values*



C is given as 740 pF, which is within 5% of the label value of 750 pF. Note that the instrument provides both series (C) and parallel (CII) values of capacitance - usually, they will be virtually identical. Since  $R=0$  (resistance of the component leads), the impedance (Z) of -43  $\Omega$  is identical to the numerical value of the reactance (X).

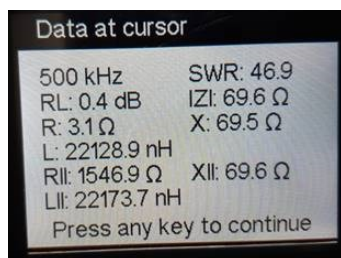
### Inductance

The procedure for inductors (coils and chokes) is identical to that described for capacitors, except that  $X_L$  should be between +20 and +100 Ohms when making the measurement.

In this case, the measured inductance of 22,128 nH or 22.1  $\mu$ H agrees with 22  $\mu$ H stated to be the component value. Note that because the inductor consists of a coil of wire, it has a measurable R of 3.1  $\Omega$ .

In future issues, we will describe a few other great features of the AA-600.

~ John VA7XB



## SEA-PAC 2020

We have a report that the SEA-PAC Committee is already hard at work for SEA-PAC 2020, June 5-7, 2020 in Seaside, Oregon. With a newly remodeled Seaside Convention Center, 2020 is sure to be a great year.

The 2019 Workshop, "Power and Communication When Everything Goes Dark", was videotaped and the final production is available for viewing. The five workshop videos are now available on the SEA-PAC website (<https://www.seapac.org>) on the "Workshops > Past Workshops" page along with the ten sets of presentation slides that are available on the "Workshops>Past Presentations" page.

This is a great Amateur Radio event with lots of dealer bargains (no tax), a Ham flea market and a comprehensive schedule of technical and non-tech presentations.

# Tech Topics

Daniel Romila VE7LCG

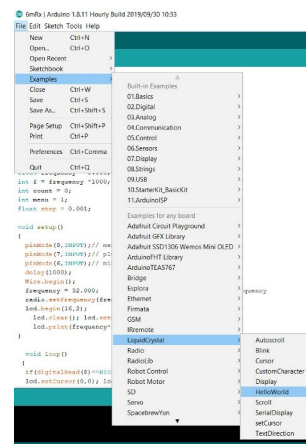
## Rx 6 meter with Arduino Nano RDA5807M and LCD1602

In the past I presented radios using Arduino [see *The Communicator*, April 2019 and June 2019]. In those articles I noticed the radio module RDA5807M in principle could be also used for the six meter ham radio band. The problem was that the library (= the code specific written for this module and similar radio modules) does not even take into consideration allowing the user to take advantage of what the hardware already knows. The library that everybody uses was written by Matthias Hertel. A Romanian (Radu-Eosif Mihailescu) made a more comprehensive library some 5 years ago, and abandoned it before giving practical implementation examples, with schematics, radios and programs for those that work.

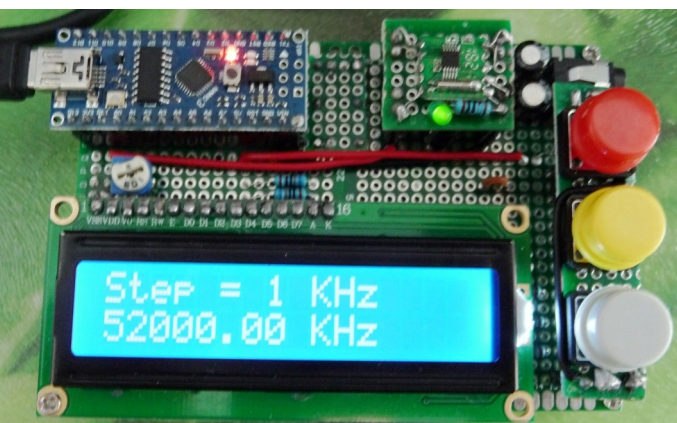
I started this project after a long email discussion with Alexander Liman, a very knowledgeable Russian guy who made a FM radio with similar schematics (classic schematics). His FM radio implementation has incredibly good ideas, and I also made a similar commercial FM radio with his designs (not the subject of this article, but of a future

The solution for the six meter receiver was to fool the circuit as something else. I made it believe that it was a TEA5767 radio module, a pin by pin compatible module with less capability. In this way I did not have to tell the RDA5807M which band of frequencies to use (mandatory for the RDA5807M, and when I would instruct it to receive 50 MHz it would remain on the air, because the library does not define my wish!).

I connected the Arduino Nano board with the LCD1602 display in the standard way. That means I used D12, D11, D5, D4, D3 and D2 from Arduino to connect with the pins RS,E,D4,D5,D6,D7 from the LCD1602. In this way I can verify using examples that come with Arduino to verify that the wiring is OK. I can load the "Hello world" sketch from Arduino IDE shown on the right.



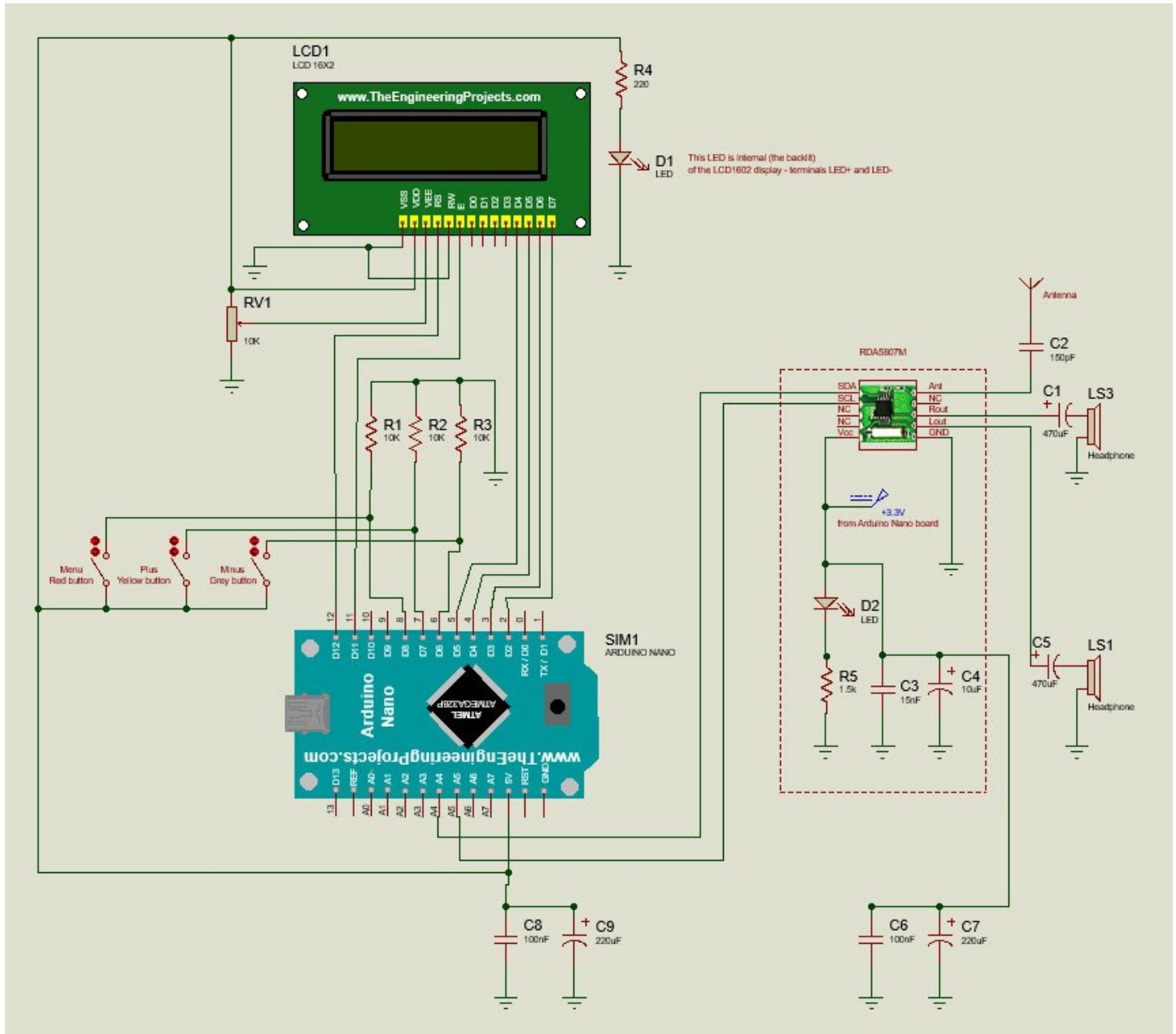
The final receiver looks like this and the schematic is on the next page.



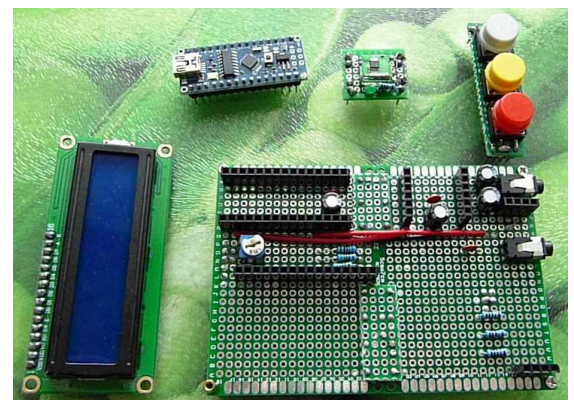
one), expanding the menus and capabilities based on his work. Alexander Liman does not currently have an available RDA5807M module, so he could not experiment and contribute to the 6 meter receiver.

I highlight here that:

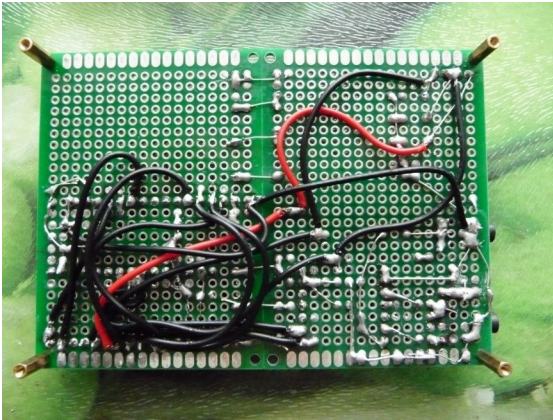
- Decoupling capacitors, immediately at the modules pins are mandatory. Not necessary, but mandatory. Otherwise there would be software glitches and somebody can look for ever for bad wiring, when in fact it is a decoupling issue. I've been there, I've done that.
- The RDA5807M module has to be installed on another PCB, and further wiring to be done from the support PCB, not directly from the RDA5807M. The module is as flimsy as it can be, and can sustain only 1-2 soldering attempts.



I often use in my projects double sided perforated PCB as motherboard. It is very fast for prototyping. I use sockets for the modules, and in this way I can re-use my modules in many other projects. I do not need any of the projects I make; it is not even a professional interest. It is just a mental exercise for me. And yes, soldering and coding projects with microcontrollers are very intense mental exercises. The “motherboard” with the following modules is shown on the right.





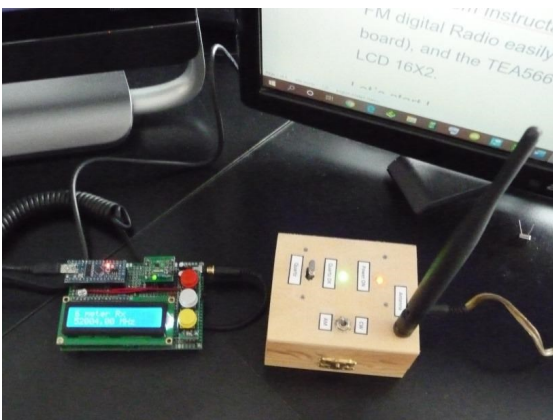


[left] I know, you want to see the back of it, where the wires are, to tell me it is not nice. Actually it is very solid. There are just several connections to be made, and the schematics can be verified step by step.

Power is supplied through the USB connector from the Arduino Nano board.

Declaring RDA5807M as TEA5767 meant I lost the volume control software capability, since TEA5767 has no such capability. But the signal level, by default, is more than enough for headphones, eventually earbuds with an inline potentiometer.

In order to see that the receiver indeed works on the 50 to 54 MHz band, I used a quartz generator that I made, and presented in the April 2018 issue of The Communicator. In the pictures you see them one next to another, but I do not recommend putting them so close [bottom left].



The 3 buttons are:

- MENU, for selecting steps of 1 KHz, 10 KHz, 100 KHz and 1 MHz. I did not use the library functions for frequency search of RDA5807M. So each selected frequency is seen by RDA5807M as a singular event, not like a succession of events with library imposed steps.

- PLUS, to increase the frequency
- MINUS, to decrease the frequency

This six meter receiver with Arduino works, but it is more a kind of proof of concept than a practical receiver for use. Actually, it can do the trick for local traffic, but it still is mainly a proof of concept.

On the same schematic and the same hardware I made a commercial FM radio with 50 memorized stations, auto search, manual search, volume, bass boost, RDS (it displays info about the music on the station, if the station transmits such digital info, and the majority of the stations from Vancouver do that). I only changed the software uploaded into the Arduino Nano board. Now I have 2 Arduino Nano boards, each with its own software, and I can introduce and extract them from the motherboard socket and play as I want, either with the 6m receiver or with the commercial FM receiver.

The commercial FM receiver with Arduino is heavily based on the work of Alexander Liman - some 95%, not to say directly that I could not have come up with the solutions and ideas he came up with, and I just built on them, cleaned up the bugs and modified their implementation.

But that will be a future article.

~ Daniel VE7LGG

YouTube video with the receiver in operation:

[https://www.youtube.com/watch?v=2H7L6JWE\\_bs&feature=youtu.be](https://www.youtube.com/watch?v=2H7L6JWE_bs&feature=youtu.be)

The schematics and the code: <https://github.com/danielromila/6-meter-Rx-with-Arduino-RDA5807-and-LCD1602>

# Tech Topics (continued)

Daniel Romila VE7LCC  
and Alexander Liman

## Arduino FM receiver with RDA5807M, LCD1602 and 3 buttons

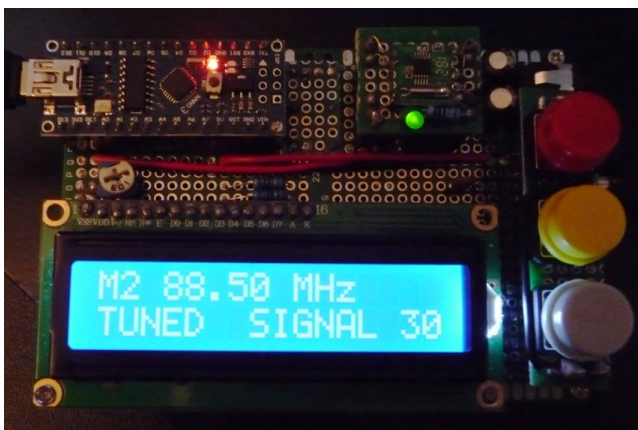
This article is written by Daniel Romila but it is based on the work of Alexander Liman, who is co-author. Daniel heavily modified the schematic and code created by Alexander. You can see Alexander's work at: <https://www.youtube.com/watch?v=gMmRLU60gho>

This article presents an Arduino commercial FM radio with Arduino Nano, RDA5807M radio module, an LC1602 display and 3 buttons. **The same schematic was used for a 6 meter amateur radio receiver**, which is the subject of the preceding article. So, with the same schematic you can have two receivers by just changing the code loaded into the Arduino Nano board.

You can see the functional radio at:  
<https://www.youtube.com/watch?v=ydHF1U-pbds>

Code, schematics, screenshots and user manual for the radio I built are available at: <https://github.com/danielromila/Arduino-FM-radio-with-RDA5807M-LCD-1602-and-Nano-board>

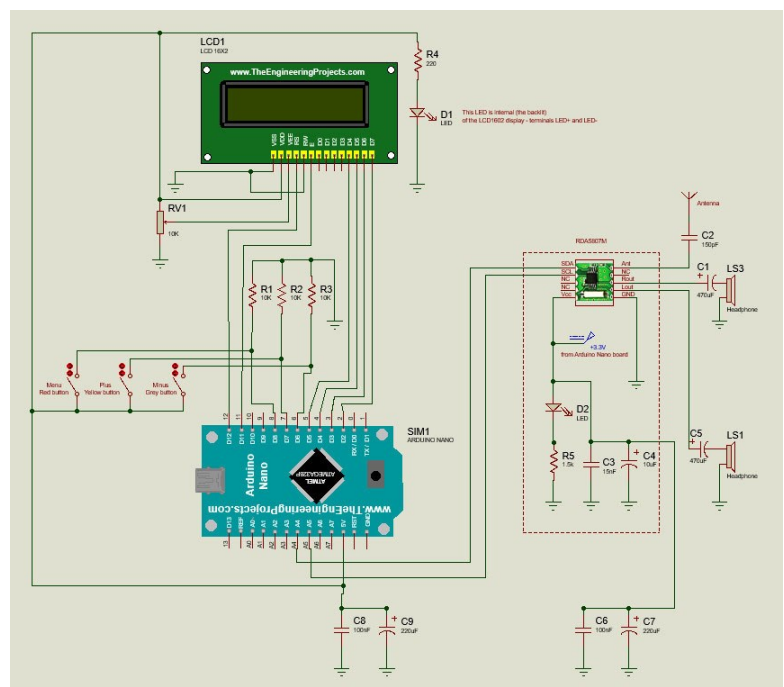
*The final product*



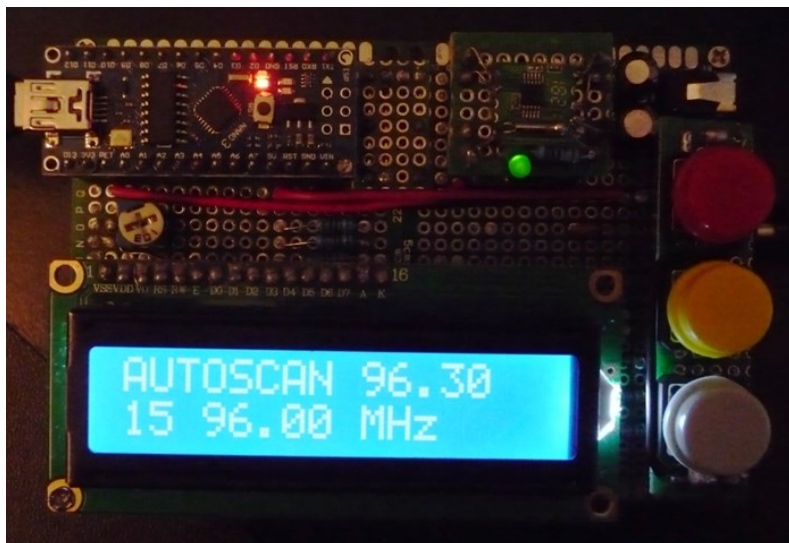
*The schematic for this article*

I want to immediately underline the necessity of having decoupling capacitors, as shown in the schematic, directly at the + and - pins of the radio module and of the Arduino Nano board. Otherwise there could be many functional glitches where you would suspect wiring, while the wiring might be OK.

I modified the schematics by using the standard pins to connect the LCD1602 with the Arduino Nano board. This means that all examples from Arduino IDE, like the "Hello World" sketch will work in my schematics (but not in his), because I use the pins as those examples use them. From the functional point of view, if you want to dedicate the Arduino board and the LCD only for this radio and not reuse the assembly, Alexander's schematic is fine. My schematic also allows verifying step by step.



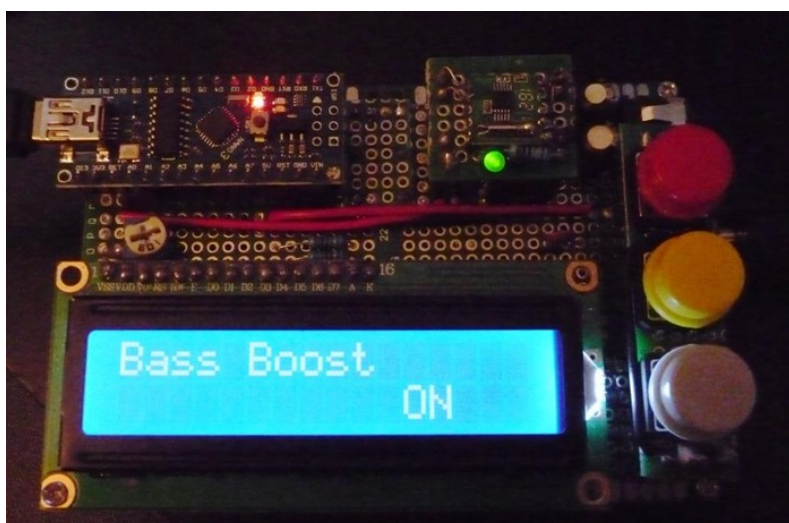




Attach the Arduino board to the LCD and see if it displays OK, and after that go into the buttons and the radio part.

Alexander's version was very ambitious and implemented 10 memories for stations, plus one for the last used level of audio volume, memories that could remain even if the power supply was disconnected. Unfortunately his code worked on his old Arduino Nano boards but not on mine and not on the boards of some readers of his posting. Alexander made a patch, which first requires loading an initial program into the Arduino Nano, and after that loading the real useful sketch.

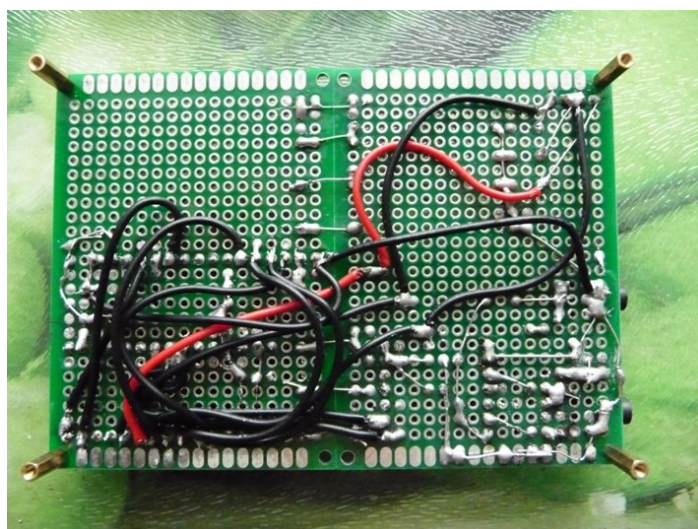
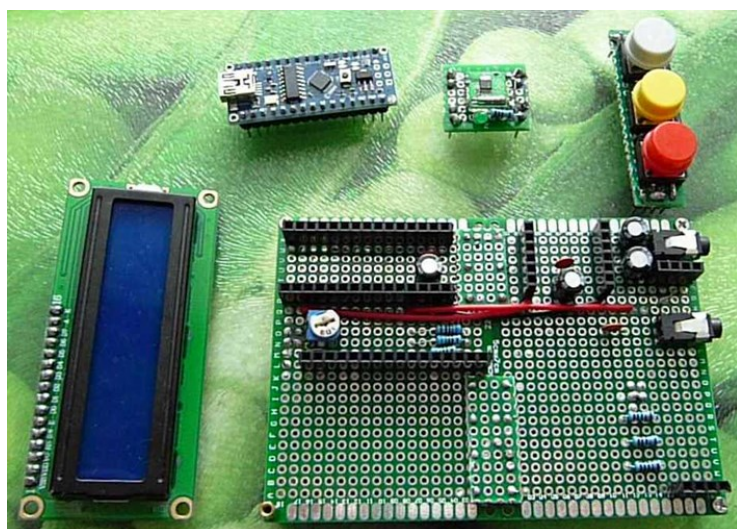
I still had some problems - which could be from my build - and I completely eliminated the EEPROM things. I did not consider it safe and replicable by others of a sketch that works on some boards and does not work in other boards.



I implemented an autoscan which can keep up to 50 memorized stations, as long as the power is not disconnected. I really need more than 30 memories in our Vancouver area. 10 memories, as in Alexander's version, would have allowed me to hear only the first stations, from the lower frequencies of the band.

I added the bass boost as the 5th menu.

I completely re-coded the manual search. Now it no longer tunes outside the 88 MHz - 108 MHz band. The manual search has steps of 100 KHz for short pushes of the buttons and 1 MHz for long or continuous pushes of the buttons. This is very useful, and I really needed to implement it





because going from 88 MHz manually to 108 MHz would have required a long time otherwise.

I changed various displays, to give indications to the user what the radio expects to be pushed and why.

The practical version was built on a double sided perforated PCB. I used sockets for the modules.

Because there are 5 menus with various options *I wrote a user's manual*, which can also be found at:

<https://github.com/danielromila/Arduino-FM-radio-with-RDA5807M-LCD-1602-and-Nano-board>

There are 3 buttons:

MENU;  
PLUS;  
MINUS

There are 5 possible displays for the menu:

Volume:

88.10 MHz

|||||

Going through the memorized stations (resulting from an auto scan):

Push UP or Down  
to access memory  
M1 88.10 MHz  
TUNED SIGNAL 27

Auto scan

AUTOSCAN if you  
Push UP or DOWN

AUTOSCAN 88.10

1 89.10 MHz

Manual tuning:

manual 88.10 MHz

TUNED SIGNAL 27

Bass boost:

Bass Boost  
OFF

In whatever menu the radio is set, after around 15 seconds of doing nothing the radio will automatically return to the Volume menu.

88.10 MHz

TUNED STEREO

And when pushing UP or DOWN buttons:

88.10 MHz

|||||

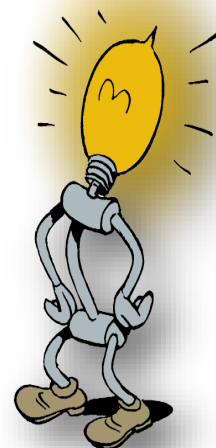
After a while the second line of the display will show the information, in digital format, that the station broadcasts, like the name of the station, the song played at that moment and so on. The majority of Vancouver stations have this kind of digital information.

While all the modifications I did took me many hours, and seem major, everything was done based on Alexander's work. It was much easier to modify a program that already worked than to start from zero.

~ Daniel Romila VE7LCG  
Alexander Liman

*We have featured a number of articles using the Arduino. Please check our back issues, available at <https://VE7SAR.blogspot.ca>*

*Specifically the **January 2019** issue provides a lot of basic information about Arduino operation and use.*



# The Contest Contender

John Brodie VA7XB

## The RAC Winter Contest

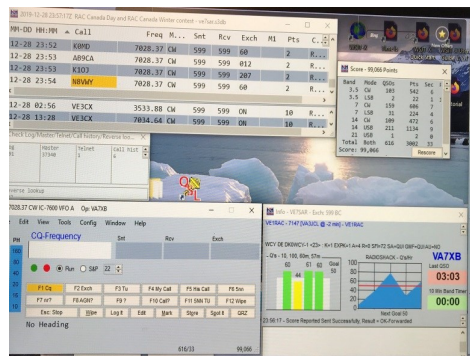
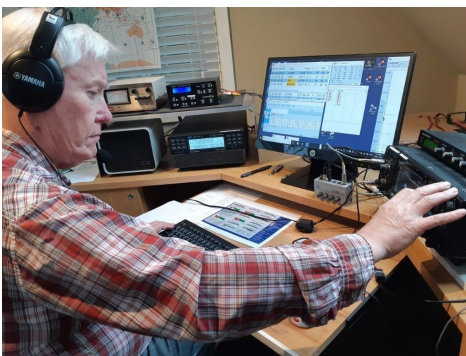


The RAC Winter contest is a fun, low-pressure event which takes place at the end of December while the festive spirit of Christmas still lingers. In this 24 hour annual contest, VE, VA and VY stations are the sought-after quarry. Participants are mostly from North America, but other countries may take part, as we found with a number of JA stations. An SARC team was assembled from the membership: Kapila VE7KGK, Jan VA7VJ, Slawa VE7LWW, Robert VA7FMR, John VE7TI, Sheldon VA7XH and John VA7XB showed the VE7SAR flag in the category

of Multi-Op Single Radio High Power. A recent ham class grad, Johnny VA7JJY, joined the party under John TI's wing to see what contesting is all about. Propagation was poor, as expected under current conditions of low solar activity, with 20m the band of choice during the day, and 40 & 80 m at night. However, even the faithful 20 m died out by mid afternoon moving most activity to the low bands well before sunset.

Our claimed score was 99,066.

~ John VA7XB



CATEGORY							QSO									
Oper	Trx	Band	Mode	Pwr	Rank	Call : 103	Score	Total	160	80	40	20	15	10	Total	
MULTI-OP	ONE	ALL	MIXED	H	1	VO1A	212534	852							47	
				H	2	K3AJ	191520	620	79	160	161	214	6		56	
				H	3	VE7SAR	99066	616		105	190	320	1		33	
				L	4	W4VS	51912	208	9	25	69	93	12		36	
				L	5	N9VPV										
MULTI-OP	ONE	ALL	CW	H	1	WO1N	5040	110	4	66	14	26			10	
MULTI-OP	TWO	ALL	MIXED	H	1	VE7RAC	261632	936	25	73	185	586	67		56	

## RAC Canada Winter Contest 2019

Contest Period: 0000 UTC to 2359 UTC December 28, 2019.



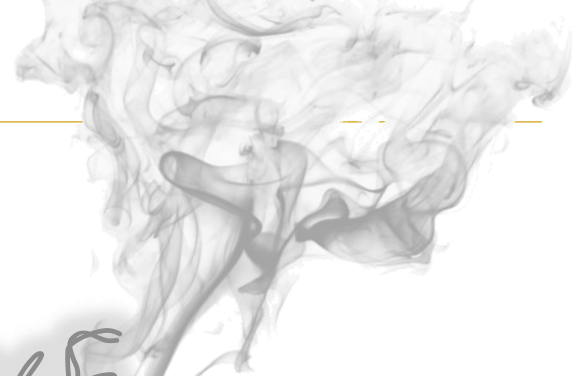
The VE7SAR RAC Winter Contest crew: Previous page [L>R] Robert VA7FMR; Our final N1MM tally; Sheldon VA7XH, Johnny VA7JJY and John VA7XB.

Above: Jan VA7VJ; Sheldon VA7XH, Johnny VA7JJY, and John VE7TI; Slawa VE7LWW. Kapila VE7KGK; John VA7XB and Johnny VA7JJY; and our host John VA7XB in the final minutes of the contest raking in some CW contacts on 40m..



SARC members were also active at Fred VE7IO's station working VE7RAC. Here are John VE7TI and Stan VA7NF in the early hours of the contest. It was slow at the start, a lot of contesters must have still been sleeping off all that Christmas turkey!





# SOLDER SMOKE

*Some of you have participated in some of our SARC workshops. We found that many had never held a soldering iron or had the pleasure of being exposed to solder smoke.*

*What follows is a primer on soldering history and some tips on techniques and selecting tools.*

If you want something done right, do it yourself. This is a phrase that makes sense if you prefer to handle your own projects around the house and/or experiment with tools. Then again, you might also be a professional repair person, plumber, or simply a hobbyist looking for something to keep you busy around the house. Regardless of the situation, a soldering station comes in handy when you decide to take on such a project for yourself.

Soldering is a process by which two or more items (usually metals) are joined together by intense and directed heat with a filler metal (or solder) used at the joint. The filler metal usually has a lower melting temperature than the adjoining pieces. Depending on the application involved, a variety of alloys can be used as filler materials during the soldering process. These include alloys like tin-lead, tin-zinc for joining aluminum, lead-silver and cadmium-silver for delivering strength at high temperatures, zinc-aluminium for corrosion resistance, and tin-silver/tin-bismuth for soldering electronics.

## **Soldering Through Time**

Soldering dates back to as early as over 5,000 years ago in Mesopotamia and ancient Egypt. Think of all the gold work crafted by the ancient Egyptians and their use of metallurgy. Some of the most impressive soldering achievements can be contributed to the Romans who soldered 400-km long water pipes made from lead with seams that could withstand 18 ATM (water resistance).

Many of the earliest solders available were alloys that could be found in nature, which meant that only a few solders with a severely limited range of properties were actually available for use during those times. This further suggests the idea that solders could only be worked by skilled artisans spending much of their time joining jewelry or attaching handles to decorative vessels. As the materials were considered rare and costly, only the wealthy could afford them.

Both improvement in soldering skill and an understanding for the scientific interactions involved in the process have occurred during the last century. Soft soldering, for example, developed into an independent field of engineering in the electronics industry and combined the concepts of chemistry, metallurgy, and physics.

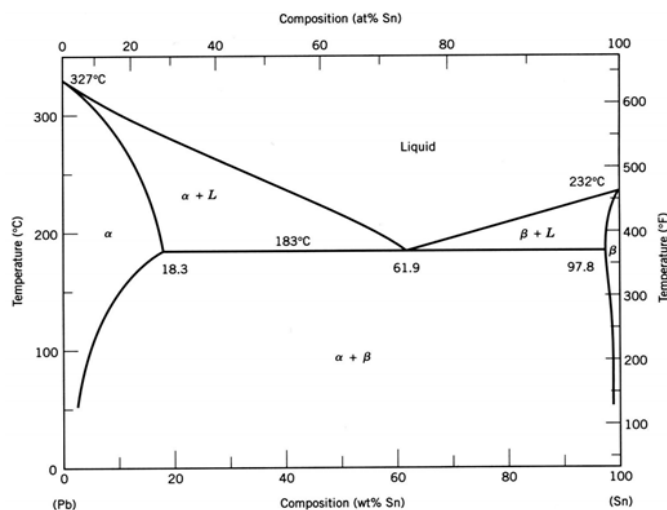
In today's computer age, soldering techniques still play a major role in the production of printed circuit boards



(PCBs), which are defined as intricately-designed pathways created by metallic insertions for the smooth transfer of electricity. This type of soldering requires detailed work on a very small scale to ensure no interruption of operation with the electronic device that makes use of the printed circuit board itself. That said, soldering can solve many problems that go beyond simply bonding 2 pieces of metal together.

### The Scientific Explanation

Solder contains more tin than lead, in such proportions that the melting point of the alloy is lower than the melting point of either pure lead or pure tin. This ideal composition is about 62% tin and 38% lead, which forms a *eutectic*. Here is the phase diagram showing this: Note the eutectic at 61.9% Tin.



Also with this alloy, the solder melts directly at the lowest possible temperature without going through a mushy or S + L phase.



## Soldering and Safety

Typical soldering iron temperatures are at about 320 deg C. If you solder, it is inevitable that you will burn your fingers now and then. I've been soldering for decades and I still burn myself periodically. Ouch!

Soldering iron burns are usually not too serious. They tend to be more of a problem for soldering "newbies" because "hot metal looks like cold metal", and newbies have a tendency to try to "get right in there" with the iron and the solder. Use caution and make a plan for how you will get the soldering iron into tight places.

If you get burned, then cold water will help. Before you rush to the cold water tap, however, be sure (despite the pain in your finger!) to put your hot soldering iron back down safely onto its holder - you don't want to burn your desktop or flooring while you are away tending your wound.

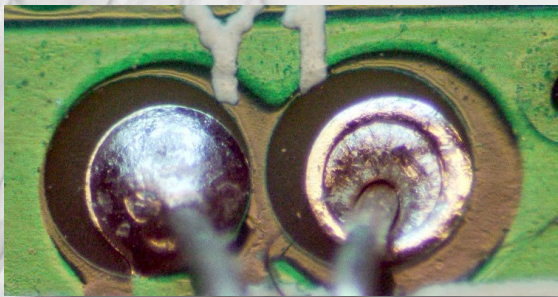
The second safety factor for soldering is the potential ill effects of the smoke (particularly lead oxide) that soldering releases. It isn't good to breathe this smoke in. Most of the smoke is from the resin that helps the solder to flow, but a small percentage may contain vaporized tin, lead, or silver. Yecch!

If I am going to be doing a lot of soldering, I use a portable electrically-powered fume extractor that sucks in the solder smoke and traps these small particles in a replaceable filter. See below for a photo of my unit, from Weller, a big soldering iron company.

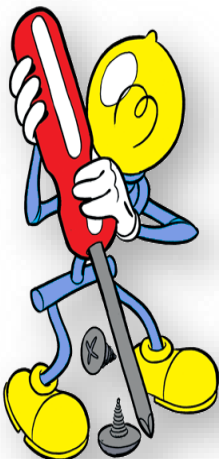
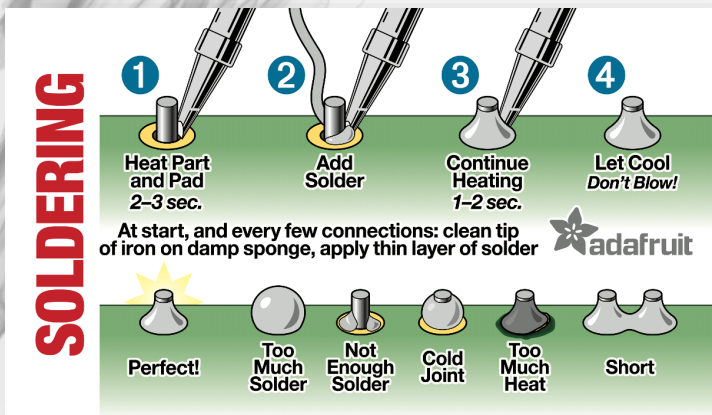
If I only have a small number of wires or points to solder, I don't use the fume extractor, but rather just ensure that I exhale as the smoke rises from the newly-soldered joints. I blow the smoke away gently as it rises and thus avoid breathing it in. For bigger jobs, however, as noted above, I always use my little filter unit.

~ Kevin VE7ZD/KN7Q





Above: A good solder joint left and a 'cold' or poor solder joint right.



Learning how to solder with proper soldering techniques is a fundamental skill every Amateur should master. MakerSpaces outlines the basics of soldering irons, soldering stations, types of solder, desoldering and safety tips. Whether you're building a radio or working with Arduino, knowing how to solder will come in handy.

**FREE EBOOK (PDF) - [Learn To Solder Guide \(17 pages\)](#)**

Need more info? Check out this complete soldering tutorial:

<https://www.makerspaces.com/how-to-solder/>

There are 3 forms of soldering that require progressively higher temperatures resulting in progressively stronger joints. These 3 forms include soft soldering, silver soldering, and brazing. With soft soldering, the primary ingredients are tin and lead. Heat is applied to the pieces that you intend to join, while the melting point of the filler material is around 183°C (361°F).

When the filler melts, the two pieces bond together in a process called wetting. Soft soldering uses the lowest temperatures, but does not form a joint as strong as other forms of soldering. Silver soldering is used most often by jewelers and machinists for repairing or bonding precious metals. It forms stronger bonds/joints than soft soldering and requires the use of a torch at very high temperatures. Brazing produces the strongest bond of all 3 forms of soldering, thanks to its use of a brass alloy as a filler.

Your intended goal determines the kind of station you'll invest in. For example, if you consider yourself a fix-it Felix, a hobbyist, or a hardware engineer, then strength and conductivity of the soldering bonds would be most important to you. However, intricacy and accuracy of the iron used is also important, especially if you're working with electronics.

Choosing the right soldering station isn't that daunting of a task. You just need to ask yourself what you plan to use it for. Many stations feature convenient, easy-to-read digital displays so you always know how hot your iron is, while others let you program your temperature so that it always remains constant. This ensures the most consistent bonds.

Other soldering stations include iron stands with adjustable tilting angles that come in handy when working with oddly-shaped metals. Depending on the available space in your workshop or garage, the size and ability to store the station and its components matter a great deal.

<https://thewirecutter.com/reviews/best-soldering-irons/>



## British Columbia QSO Party 2020

**1600z Feb 1 to 0359z Feb 2 AND 1600z to 2359z Feb 2**

Rebecca VA7BEC

**orcadxcc.org**  
Amateur Radio from British Columbia and Northwest Washington



The 2020 BC QSO Party will be held February 1 and 2—it's not far off. If you're in BC, activate your electoral area. If you're outside BC, point your antennas at VE7 and have a great time!

### Objectives:

- Stations in British Columbia contact other stations in the province as well as the rest of Canada, the United States and beyond.
- Stations outside British Columbia make contacts with VE7/VA7 stations.
  - ♦ Original photo certificates for top scores in all classes of entry, BC and outside BC. New photo every year! Collectible!
  - ♦ Special photo certificates for top score in each federal electoral district.
  - ♦ Additional certificates may be awarded to recognize outstanding results by state/province/DX entity, if participation level is particularly high.
  - ♦ Plaques offered in 10 sponsored categories: Top YL, Top BC single-op, Top BC multi-op, Top US, Top Canada outside

BC, Top DX, Top Mixed Mode, Top CW, Most Federal Districts Contacted and Top Club in BC

- ♦ BCQP is fully supported by N1MM contest logging software, CQ/X GPS-enabled software for mobile contesting, N3FJP state QSO party logging programs and several other generic programs.
- ♦ Follow links at URL:  
<http://orcadxcc.org/bcqp.html> for rules, tools, helpful hints, and in-depth event analysis/reports and scores from past years.

### Questions?

Email the contest coordinator, Rebecca VA7BEC at [va7bec@rac.ca](mailto:va7bec@rac.ca)

[View the rules for BCQP 2020](#)

**Join the club.** Here's how to [become a member](#).

Join Orca DXCC in BCQP 2020

It's a whale of a good time!

~ Rebecca VA7BEC

Just South of the border, in Blaine, WA, Hams provide volunteer service to police, but their duties are not limited to communication: When Blaine's annual Christmas tree lighting took place on Saturday, December 7, a team of amateur radio operators worked quietly in the background, assisting the Blaine Police Department. See the story at <https://www.thenorthernlight.com/stories/amateur-radio-operators-provide-assistance-to-blaine-police-department,8852>

## Some Positive Steps Forward With Shack RFI

Mike Weir VE9KK

### End-fed antenna solutions



*I was using an HDMI feed from my PC to the monitor, as I always have in the past, BUT I was not faced with the RFI issue.*

I have had some positive moves forward with regards to my RFI in the shack. I am the kind of person who has to sit back and just think things over, go on the internet, step back and have a good look around. Over the past few days that is what I have been doing. I have had great feedback from my blog readers and it has cause me to think and search out ideas.

This was the first time I had ever had these types of issues in the shack but then again I have never used an end-fed antenna before. With regards to my internet adventures I came to the understanding that, where end-fed antennas use the coax as a counterpoise, there can be expected issues with RFI in the shack. My end-fed antenna from W1SFR does not have a separate counterpoise connection. On their website the purchaser is informed the coax is the counterpoise. With regards to my W1SFR end-fed antenna I have contacted Steve the seller many times via email with my questions. His support has been great and Steve has been very willing to afford me as much of his time as needed.

I am the kind of person that things just don't click right away and I need time to mull things over. One thing that came to mind was my monitor issue I was having. I was using an

HDMI feed from my PC to the monitor, as I always have in the past, BUT I was not faced with the RFI issue. I remembered the coax that came with the antenna had a set of RF chokes on the coax. The reading that I have been doing, and the comments on my blog all backed up the fact that with end-fed antennas there is a very strong possibility of RF on the coax if it is being used as a counterpoise. I was able to add the coax from Chameleon to my setup with the RF choke section of coax connected to my radio. I did some testing and found my capacitive touch keyer no longer locked up, my SWR was no longer sporadic. I have not as of yet checked my electronic washing machine to see if it stops, but that will be when the next load of laundry goes in.

I replaced the HDMI cable with a DVI cable that had RF chokes at either end. This solved my monitor issues of it waking up from sleep mode on it's own and random characters showing up on the screen.

I did on Friday end up ordering the Balun Designs 1115 balun and it should be arriving within the next week or so. My positive tests using the RF choked coax tells me that the purchase of the balun was a good choice. My next step will be to try out a counterpoise that is 25 feet long secured at the PL-259 that feeds the W1SFR end-fed antenna and see what this step produces. I am hoping with the new balun, the counterpoise and changing the monitor cable will solve the issues I have been experiencing.



Old HDMI monitor cable

It now the next day and my experiments with the separated 25 foot counterpoise have been completed. I stripped one end of the 25 foot piece of wire and attached it to the outside of the PL-259 using a screw clamp similar to the clamps you see on automotive rad hoses... but much smaller. I checked the SWR on 40m, 30m, 20m and 18m and it really did not change much but what did change was the amount of RFI what was showing up on my waterfall on the 7610. I then removed the counterpoise and the offending RFI was gone. So that was good enough for me I am going to keep the Chameleon coax with the chokes in place until the Balun from Balun designs comes in.

*Chameleon coax choke*

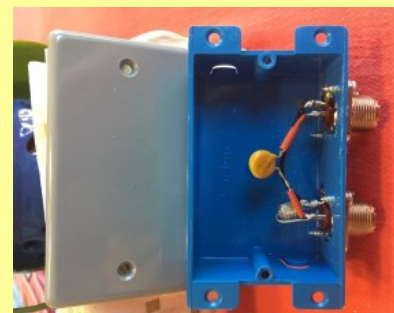


A few minutes with a soldering iron and you can build all manner of lightning/EMP protection systems. These are done by soldering in gas discharge arrestors, same as are in commercial units, capable of handling spikes up to 20,000 amperes. The cost \$3 each from Digi-Key and can be soldered from center conductor to shield at any 50 ohm point in the antenna system. Add them to SWR meters, antenna tuners, and even simple electrical boxes equipped with double SO-239's to protect your gear from electrical spikes.

While grounding isn't important for the EMP aspect, it is crucially important for lightning, or nearby-lightning protection, so ground wire connection points were solidly installed in these devices as well!

See: <https://www.jpole-antenna.com/2013/03/29/lightning-protection-for-antennas/>

According to past QST articles and current US Department of Homeland Security research, these types of protection are great steps to take, and are part of "Level II" EMP protection.



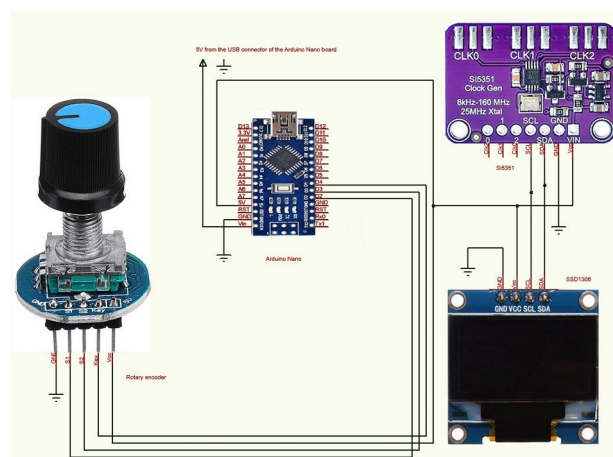


# SOLDER SPLATTER

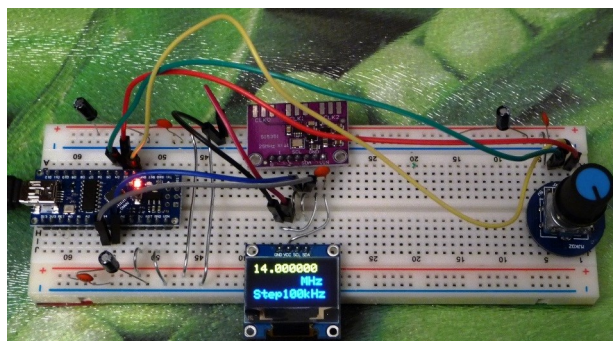
Daniel Romila VE7LCC

## VFO 10 KHz - 160 MHz

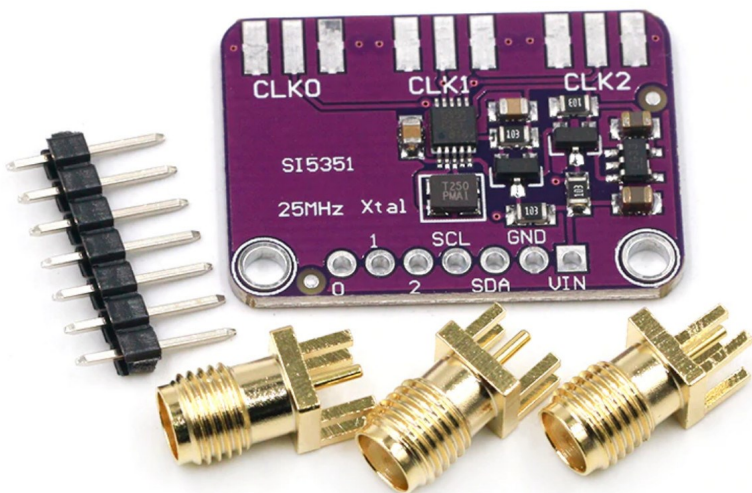
On December 13th I saw Si5351 boards on [aliexpress.com](http://aliexpress.com) for C\$3.32 - shipping and taxes included. I was excited about the possibility of having an oscillator with a wide range of frequencies, and a with digital readout in house. It is good for various adjustments, direct conversion receivers, SSB filter building and so on. Many things that I do not need, but which would be fun to build and play with.



I always draw the schematics myself, on the computer. After I have the schematics I place pictures of boards and components on top, to enhance understanding. I first made it on the breadboard, and after I went for a more sturdy, permanent solution:



The hardware in Arduino Projects is simple, except eventually soldering a bunch of connectors, as some boards have 20 pins on one side and 20 pins on the other.



On some of these boards is written 2.5 KHz - 160 MHz. But the specifications of Si5351A, or B or C is declared to be 2.5 KHz - 200 MHz. Experimentally I found that it is better to stick with the 160 MHz limit, because once it is at 200 MHz the software blocks.

I wanted something simple, with only one oscillator, not 3. Calibration (software) is not very useful for me, because I cannot do calibration at Hertz values anyhow. My board matched the digital receivers and 2 frequency meters I have. The schematics I opted for use an Arduino Nano board, a rotary encoder and a 0.96 inch OLED display:

Everybody praised the software written by Jason Mildrum NT7S and Przemek Sadowski SQ9NJE. It worked for everybody, except me. Then, at the RA3TOX website ([http://rfanat.ru/s25/dds\\_sio5351\\_pro-min.html](http://rfanat.ru/s25/dds_sio5351_pro-min.html)) I found that no, it does not work, and that there is a corrected version. I do not know if the corrected version worked at the moment of posting or not, but after a while I determined that for sure it did not. So PA0RWE rewrote the software in November 2019. That sounded promising, because there was a good chance to have the same version of libraries, the same version of Arduino IDE and firmware/bootloaders.

No luck. It seems to only work on some Arduino boards, the older ones. I did some digging (several days and nights) and wrote the software that I uploaded at: <https://github.com/danielromila/VFO-10-KHz-160-MHz>. It was not worth trying to repair the original software because it had plenty of reads and writes into EEPROM, which makes the whole project slow.

I also posted there the libraries that I used (maybe tomorrow there will be new versions of libraries and the schematics in higher resolution.

~ Daniel VE7LCG



You can see a YouTube video with the VFO in operation as a general coverage receiver at:

<https://www.youtube.com/watch?v=7KEPbQaxyXg>

## ***Neighbourhood Emergency Preparedness Program (NEPP)***

### ***Basic Course Graduates***

Five residents of West Panorama Ridge Ratepayers Association have recently completed the basic amateur radio certification course offered by Surrey Amateur Radio Communications (SARC) and Surrey Emergency Program Amateur Radio (SEPAR) to complement the Neighbourhood Emergency Preparedness Program (NEPP). Amateur radio offers the most reliable means of communication during a disaster when commercial power, telephone and Internet may be unavailable.

Congratulations to Frank Kowalishyn, Lauren Kunimoto, Rick Semple, Sally Stewart and Paul Andreassen for passing the exam and receiving federal certification. The course will be followed by a practical session on January 8<sup>th</sup> with the theme "Getting Started in Amateur Radio" hosted by SARC/SEPAR to provide guidance on equipment and how it can be used to communicate with the world. If you know of someone interested in learning more about amateur radio or wishing to register for the next course (commencing Feb. 25<sup>th</sup>) please send an email to [va7xb@rac.ca](mailto:va7xb@rac.ca).

## KB6NU's Column

### *A CW Geek's Keyer*

*Dan Romanchik, KB6NU*



At Dayton, I had so much fun giving out my CW Geek buttons that I started to think about how to extend the CW Geek “franchise.” One of the first thoughts that came to mind was designing and building a CW Geek keyer.

As I attended a couple of talks about using the Arduino open-source microcontroller platform in amateur radio projects, I decided to Google around to see what might already be available. Way back in 2009, the September/October issue of QEX featured an article by KC4IFB on building an iambic keyer with an Arduino. More recently, Goody, K3NG has been developing a more complete Arduino keyer software package.

Then, I stumbled upon the NanoKeyer kit by Oscar, DJ0MY <http://www.cqdx.ru/ham/do-it-yourself/the-nanokeyer-is-an-arduino-nano-based-cw-contest-keyer/>.

For \$35, Oscar will send you a kit of parts that allows you to build a board, into which an Arduino Nano plugs. You then download a version of the K3NG software, and you have yourself an Arduino-based keyer.

I purchased the kit, it arrived within a week, and I built the kit that evening. Aside from a few little gotchas, I managed to get it all together in a couple of hours.

One of the difficulties I had was that I managed to mangle one of the headers that the Arduino Nano plugs into. Oscar sends you 20-pin headers, but the Arduino Nano has only two rows of 15 pins, so you have to cut down the 20-pin headers into two 15-pin headers. In doing so, despite an explicit warning in the assembly manual, I managed to cut off an extra pin. Fortunately, with some careful soldering, I was able to install the header properly.

After downloading Oscar's software package, I successfully compiled and uploaded the Arduino program, and I was on the air. I've been using the keyer for a couple of days now and like it a lot. I do have some comments, though:

*When he's not trying to figure out which way current flows, Dan blogs about amateur radio at [KB6NU.com](http://KB6NU.com), teaches ham radio classes, and operates CW on the HF bands. Look for him on 30m, 40m, and 80m. You can email him at [cwgeek@kb6nu.com](mailto:cwgeek@kb6nu.com).*



- The LEDs are really bright. There are three LEDs: a green LED for power, a red LED that shows the PTT output, and a blue LED that shows the keying output. They're so bright that they can be a bit distracting.
- WinKeyer emulation works very well. I played around with it using the N1MM software, and it seemed to work without a hitch.
- Unfortunately, the USB keyboard feature doesn't seem to be working. When I tried to compile the software with that feature, I got a bunch of compile errors. I e-mailed DJOMY about this, and he said that he didn't think that Arduino Nano would support this mode.
- The NanoKeyer has a 1/4-in. phone plug on the back for connecting paddles, and I just converted all of my paddles to 1/8-in. phone plugs because that's what the WinKeyers use. ARRRRGHH. :)

All things considered, for less than \$50, I have a keyer that I can not only use just like my other keyers, but one that I can experiment with as well. For example, I can see experimenting with an LCD display to give me a readout of speed the keyer is set to, and there's some experimental code to decode CW as well.

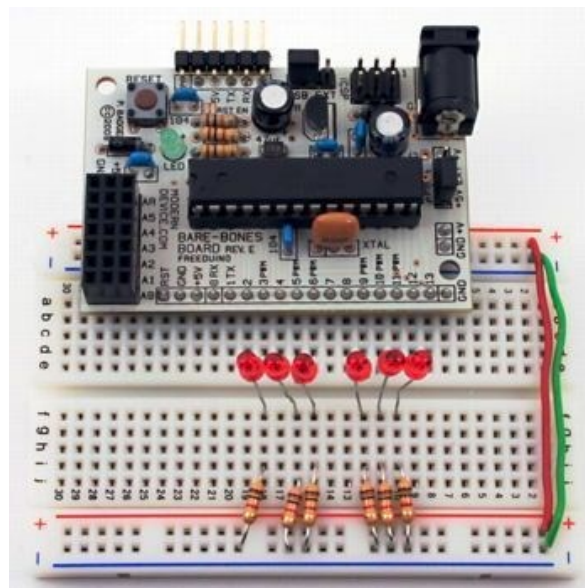
I'm sure that I'll think up some other features as well. Are there any features you would like to see in a keyer that the current crop of keyers doesn't have?

### **Another FB Construction Project**

Last night, my ham radio club, ARROW, held its annual construction night. As reported earlier, we built Bare Bones Board Arduinos, the cute, little microcontroller shown at right.

A dozen guys built one, and all but one got them working. I'm not sure why, but he decided to troubleshoot his Arduino at home.

Perhaps the most challenging part about building the kit was mounting the surface-mount inductor. The technique that I, and most of the other guys used, was to tin the pads, hold down the component with either a tweezers or needle nose pliers, and then reflow the solder. One guy had a heckuva time



doing this as the component markings were slightly misprinted on his board, with the ink covering those pads. Carefully scraping off the ink with an X-acto knife remedied that situation.

Several people commented, "They're cute, but what can you do with one of those things"? Well, the latest issue of QEX has an article that uses the Arduino as a keyer. As I noted in the previous blog post, I have an idea to use mine to interface a paddle to my computer, so that I can send code to the computer instead of typing on a keyboard. Another crazy idea I had was to hook a solenoid up to one of the outputs and key a straight key connected to a rig.

Of course, there are a bunch of other possible uses, including controlling a remote antenna switch and monitoring power supply or battery outputs. There are dozens of other applications outside the shack as well.

Of course, being ever vigilant for topics for future club meetings, the answer to the question, "What can you do with an Arduino?", is now on our schedule. Next January or February, we'll have a talk about a) how to program the Arduino and b) what one ham did with his.

~ Dan KB6NU



## *Ed Frazer VE7EF, Appointed to the Canadian Amateur Radio Hall of Fame*

The Board of Trustees of the Canadian Amateur Radio Hall of Fame (CARHOF) is pleased to announce that Ed Frazer, VE7EF, of West Vancouver, British Columbia has been named to the Hall of Fame.

Radio Amateurs of Canada recognizes deserving Amateurs by appointments to the Canadian Amateur Radio Hall of Fame. The Constitution for the Hall specifies that the appointment as Member of the Hall is made for “outstanding achievement and excellence of the highest degree, for serious and sustained service to Amateur Radio in Canada, or to Amateur Radio at large”.

The Trustees of the Hall have interpreted the Constitution to mean that the person has performed significant service over many years to enhance the well-being of Amateur Radio.

Ed Frazer, VE7EF, has been an Amateur Radio operator since 1953. In his early days, he was President of the University of British Columbia (UBC) Amateur Radio Club while earning his degree as a Professional Engineer. He subsequently earned a Master of Business Administration (MBA) degree.

In his professional life, Ed enjoyed a successful career with the British Columbia Telephone Company, and founded National Electrolab which provided electronic calibration laboratory services as well as electronic design services.

More recently, he managed a radio and communications consulting and engineering services business. He also served as Chair of the Vancouver Chapter of the Institute of

Electrical and Electronics Engineers (IEEE) and as President of the Simon Fraser University (SFU) MBA Alumni Association.

In addition to his career, Ed also made a significant contribution to Amateur Radio in Canada including serving as the President of the UBC Amateur Radio Club and the North Shore Amateur Radio Club (NSARC). He is also the Co-founder of the British Columbia Amateur Radio Coordination Council (BCARCC) and has held both Director and Officer positions ever since.

Ed also served Amateur Radio on the national level as the RAC Director for the British Columbia and Yukon Region and as the Chair of the RAC Administration and Finance Committee. In addition, he served for eight years as the Chair of the Board of Trustees for the Canadian Amateur Radio Hall of Fame.

Radio Amateurs of Canada and the Board of Trustees of CARHOF sincerely congratulate Ed Frazer, VE7EF, on his appointment to the Hall of Fame. He will be formally inducted into the Canadian Amateur Radio Hall of Fame at an event in the near future.

A detailed account of his achievements will be presented in an upcoming edition of The Canadian Amateur magazine.

For more information on the Canadian Amateur Radio Hall of Fame please visit: <https://wp.rac.ca/carhof/>

~ Frank Davis, VO1HP  
Chair, Board of Trustees  
Canadian Amateur Radio Hall of Fame



# Ham Gear For Sale

MFJ 269 antenna analyzer + dip meter with attachments \$150

Contact: John VA7XB (604) 591-1825 [va7xb@rac.ca](mailto:va7xb@rac.ca)



RigExpert "AA-55 Zoom" antenna analyzer. Less than a year old. Purchased new at HRO in Portland, OR in January 2019. The unit has the original box, manual, all accessories and is in perfect shape. On sale price at HRO is US\$328.95. That is \$328.95 x 1.32 or C\$434.21. **For sale at C\$375.00**

## 70 cm Fast Scan TV Transmitter

For sale is an analog fast scan (NTSC standard) ATV transmitter in a hardened and waterproof metal case. Suitable for mounting outdoors. Last used by hams at Simon Fraser University on an emergency communications project in the early 1990s. Runs on 12 VDC. Approximately 100 feet of power/antenna/control cables included. As is, but if it doesn't work to your satisfaction you can return it. **\$100 OBO.**



Contact: Kevin McQuiggin VE7ZD/KN7Q [mcquiggi@sfu.ca](mailto:mcquiggi@sfu.ca)

## Attention Basic Course Grads! Estate sale transceivers: OPEN TO OFFERS

- Yaesu 2M FT-3000, FT-2500M, FLDX-2000B 1KW
- Kenwood TR-7930, TM-731A, TM-231A, TS-830S, TS-940S
- Radio Shack Police, Fire Scanner



Contact: Heinz Buhrig VA7AQ [workwpx@gmail.com](mailto:workwpx@gmail.com)

Kjeld has a rather large Marine Radio (HF?) sitting at his home and he'd like to find a new home for it. If you're interested contact Kjeld.

Contact: Kjeld [VE7GP@telus.net](mailto:VE7GP@telus.net)

Icom IC211, Microphone c/w 13.8vdc Power Supply  
Microwave Modules 432 Mhz Converter  
Microwave Modules 144 Mhz Multimode Transverter  
DRF CW Audio Filter  
Realistic Electronic Reverb  
Make offer on any of the above. Vendor is very motivated!

Contact: Lionel H. Edwards [ve7bqh@shaw.ca](mailto:ve7bqh@shaw.ca)

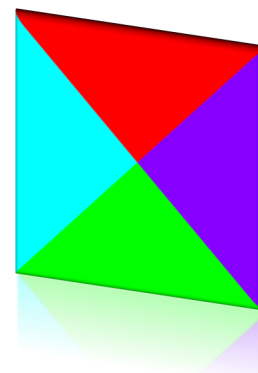




# Foundations Of Amateur Radio

Onno Benschop VK6FLAB

## Morse Code And You



With the growing availability of new ways of communicating across the globe, from digital voice such as CODEC2, through weak signal modes like WSPR, JT65, MSK144 and FT4 to name a few, with Internet linked radio such as Brandmeister and DMR and the newly granted access to all Australian amateurs to all those modes, it's easy to overlook the one mode that started this adventure.

### Morse Code

It's no longer required to obtain your amateur license, so if that was putting you off from getting your license, you can breathe easy and get right to it.

Among all the shiny new modes Morse Code continues to hold its own and for good reason. It's simple, reliable, has an amazing signal to noise ratio and if you're driving in your car and you're stuck without a Morse Key, you can always just whistle into your radio.

If you've been following my journey through the hobby you'll know that I've been attempting to learn Morse Code. For a while now. It's been a challenge, more so since I spend less and less time in a car and more and more time behind my keyboard appeasing my clients. That's not to say that I've forgotten, just that what I've tried so far has eluded success.

A little while ago I received an email from a friend, Shaun VK6BEK who let me know that there was a discussion

happening on a mailing list he was a member of and in that discussion I cracked a mention. Being the shy and retiring type I had to have a look for myself. To read the message I had to join, which is fine, since Charles NK80 has been bugging me to do that for years, well perhaps not bugging, perhaps keying me - hi hi. Turns out that the Straight Key Century Club, the SKCC, was having a recurring discussion about the topic of Head Copy or Head Reading.

To give you a sense of what that is, consider what I'm saying to you right now. It doesn't matter if you're reading this in an eBook on your Kindle, reading it on an email or online, listening to it on your local repeater, or via your favourite podcast player, for each of those the same process is happening.

You are not absorbing individual letters or sounds, but getting the meaning from the entire structure of a sentence. For uncommon words you might need to calibrate your brain, but for the most part you're just bobbing along understanding what I'm saying.

In essence you're doing the equivalent of Head Copy.

In Morse Code the same can be achieved. Ultimately it's a language, a tonal one, but a language none the less. Hearing the individual dits and dahs, followed by letters, words and sentences, eventually you'll get to a point where it all just flows.



*For the audio  
podcast  
Foundations of  
Amateur Radio  
visit the website:  
[http://podcasts.itmaze.  
com.au/](http://podcasts.itmaze.com.au/)*

To listen to the podcast, visit the website:  
<http://podcasts.itmaze.com.au/foundations/> and scroll to the bottom for the latest episode. You can also use your podcast tool of choice and search for my callsign, VK6FLAB.

foundations/ and scroll to the bottom for the latest episode. You can also use your podcast tool of choice and search for my callsign, VK6FLAB.

All podcast transcripts are collated and edited in an annual volume which you can find by searching for my callsign on your local Amazon store, or visit my author page: <http://amazon.com/author/owh>.

Foundations of Amateur Radio Volume 7 is out now - with chapters on digital modes, coax connector loss, waterfalls, station performance and more.

Feel free to get in touch directly via email: [onno@itmaze.com.au](mailto:onno@itmaze.com.au), or follow on twitter: @vk6flab (<http://twitter.com/vk6flab/>)

If you'd like to join a weekly net for new and returning amateurs, check out the details at <http://ftroop.vk6.net>, the net runs every week on Saturday, from 00:00 to 01:00 UTC on Echolink, IRLP, AllStar Link and 2m FM via various repeaters.

ITmaze -ABN: 56 178 057 063

phone: 04 1219 8888  
[onno@itmaze.com.au](mailto:onno@itmaze.com.au)

I speak a few different languages, a curse or a blessing depending on your point of view. It means that I've become exposed to how language is built up. Initially when you hear a new language your brain is trying hard to figure out where the individual sounds belong, which sound belongs to which word, how a word begins and ends, how you make a plural, all the things you take for granted after you've learnt a language.

In Morse that is no different.

Within that context of discussing Head Copy, Gwen NG3P mentioned that she used the text edition of this podcast to convert into a Morse Code MP3 file so she could learn to hear Morse and bring them with her on her mobile phone.

Gwen and I had similar aims. In the past I'd done the same with a book, Huckleberry Finn if I recall, as well as random letters and also the ARRL Morse practice downloads, but nothing seemed to work for me.

For Gwen my podcast was an obvious source, so much so that I completely missed it, since they are short and on the topic of amateur radio. The language in use is likely going to be things that you'll hear on air and there's a smattering of callsigns, so all good.

Long story short, I spent last week converting all 454 episodes of the podcast to Morse Code for your Head Copy practice enjoyment. They're encoded at 25 WPM, or Words Per Minute and the tone is 600 Hz. I even put them online and made it possible for you to add them to your podcast player.

Best part?

I now get to hear Morse Code at a pace that I'm looking for, on a topic that's relevant and I have been receiving plenty of emails from others who are just as excited as I am.

You can find these episodes on the podcast homepage at <http://vk6flab.com>. Let me know how you go.

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 .... -- .. ... .. -- .. -- ..



## Back to Basics

John Schouten VE7TI

From The Canadian Basic Question Bank

# Emergency Radio Traffic



Question B-001-011-001 asks

Amateur radio stations may communicate...

The possible answers are:

1. with anyone who uses international Morse code
2. with non amateur stations
3. with any station involved in a real or simulated emergency
4. only with other amateur stations

It is widely known that, during a disaster, an amateur station may make transmissions necessary to meet essential communication needs and assist relief operations if normal communication systems are overloaded, damaged or disrupted. You may also play a role in everyday events, for example, coming across the scene of a serious motor vehicle accident or monitoring someone's request for help. If you volunteer for public events in your community you will likely already have encountered 'emergency radio traffic'.

Emergency traffic refers to radio transmissions involving imminent danger to a person or persons. It does not generally include property, however that distinction is sometimes clouded by the opinion of the person reporting the emergency.

Let us first suppose you hear a reported Mayday or SOS transmission. If you hear an emergency call for help on your frequency, immediately stop if you are in a contact and take the emergency call. If hearing a station in distress, break in if other Amateurs are using the frequency, as they may not have heard the call. Determine the call's location and what assistance may be needed, then contact the appropriate authority to relay the information.

In an *emergency situation* you are restricted to operate within the terms of your licence however, in a *distress situation* you may exceed these restrictions.

Section 48 of [The Radiocommunication Regulations](#), made under the [Radiocommunication Act](#), states the following:

### Emergency Communications

48. In a real or simulated emergency, a person operating radio apparatus in the amateur radio service may only communicate with a radio station that is in the amateur radio service in order to transmit a message that relates to the real or simulated emergency on behalf of a person, government or relief organization.

Even in the case of an emergency situation, an amateur radio station is only allowed to communicate with another amateur radio station. Also amateur radio stations must follow the technical requirements set out in [RBR4 - Standards for the Operation of Radio Stations in the Amateur Radio Service](#) at all times. There are no exceptions to power and band limitations as set out in this document.

Although there is no explicit exception made to this within the regulations, if an amateur station is in distress, it is acceptable for that station to use **any** means of radiocommunication at its disposal. A station in distress should not be concerned with power or band limitations or any other restrictions. This is the take away from questions B-001-011-005 and B-001-011-007 in [RIC-7 The Amateur Radio Basic Question Bank](#).

In emergency communications It is important that amateur operators consider whether to make a distress call or if it is an urgency that doesn't require immediate attention. The benefit of the doubt should be with the station making a distress call.

Also worth noting is that simply because it is acceptable to exceed the restrictions in a case of distress, it should not be used as justification for not meeting the standards in RBR-4 or any other restrictions in regular operations of an amateur station. For example, in section 10 of the RBR-4 it says "The transmitting power of an amplifier installed at an amateur station shall not be capable of exceeding by more than 3 dB the transmitting power limits described in this section".





*[The foregoing as per Kasun Somaratna, Spectrum Management Officer, Spectrum Management Operations Branch - ISED Canada]*

Please note the distinction made by Industry Canada between Emergency and Distress operation.

Not all emergencies are distress situations, however that is a fine line open to individual interpretation. That leaves the quandary of “Can I legally exceed my licence restrictions or not”? One would hope that the benefit of doubt would be with the Amateur in distress or responding in an emergency.

The proper way to interrupt a repeater conversation to signal a distress call, is to break in immediately following the transmission of the active party and state your situation and call sign.

The proper distress call is ‘Mayday’ in phone (voice) mode, not ‘emergency’ or ‘help’. In CW the proper call is “SOS”. Of course false and deceptive Mayday or SOS communications are a criminal offence and subject to prosecution.

A couple of other emergency preparedness hints:

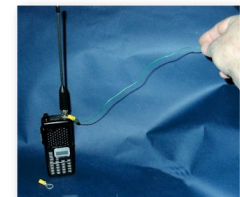
- Keep transmissions short when using a repeater because a long transmission may prevent someone with an emergency from using the repeater;
- Its a good idea to have a way to operate your amateur station without using commercial AC power lines so you may provide communications in an emergency. This may be done using a DC adapter for your vehicle’s accessory plug or an adapter and cord that provides battery power for your transceiver at home;



- The most important accessory to have for a hand-held radio in an emergency is several sets of charged batteries. For maximum versatility, I prefer to purchase a battery pack for new handheld transceivers that accept standard alkaline or NiMH rechargeable AA cells;



- A dipole is the type of antenna that would be a good choice as part of a portable HF amateur station that could be set up in case of an emergency. They are easily made and could be as simple as a counterpoise attached under the antenna terminal of your handheld transceiver.



*[To make a counterpoise, see <https://ve7sar.blogspot.com/2019/10/double-your-range-counterpoise-for-your.html>].*

Finally, Amateur Radio has a proud history of assisting with communications in an emergency. Communicating via radio what we do everyday as part of this hobby and we can give back to the community for the spectrum privileges that we enjoy.

“Five minutes before the party is not the time to learn to dance”. The Communicator is read worldwide, wherever you are, please consider joining your local emergency program. Here in Surrey, Canada that would be [SEPAR](#).

So, to answer our original question: “Amateur radio stations may communicate...”, the correct answer is number 4: “only with other amateur stations.”

~ John VE7TI

## Study Links

Whether you are new to the hobby or brushing up on skills, you should find these study links helpful:

1. RIC-7 is the entire up-to-date Industry Canada (IC) Basic Question Bank. <http://tinyurl.com/CanadaBasicQB>
2. There is a RIC-7 that has some explanations along with the questions. [RIC-7 2014rev08.05 with explanations](#).
3. The Amateur Radio Exam Generator is at: [https://www.ic.gc.ca/eic/site/025.nsf/eng/h\\_00040.html](https://www.ic.gc.ca/eic/site/025.nsf/eng/h_00040.html)
4. The ExHaminer Study software for Windows is at: <https://wp.rac.ca/exhaminer-v2-5/>
5. There are plenty of good resources for both basic and advanced exam study courtesy of the Cold Lake Amateur Radio Society at: <http://www.clares.ca/va6hal%20training.html>

Contact SARC if you wish to write the Basic or Advanced Exam. If you pass we’ll even give you a year’s free SARC membership!

**Newly Licensed?** When you receive your paper license in the mail, it will come with a form that can be filled out and mailed to the Radio Amateurs of Canada office, at which point an introductory RAC one-year membership will be set up. Introductory memberships are identical to our existing basic memberships and you will receive The Canadian Amateur magazine for one year.



# January 2020

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4						7:30-9:30 AM SARC Social: Kalmar Family Restaurant 8076 King George Blvd, Surrey, BC  CONTEST: ARRL RTTY Roundup
5	6	7	8	9	10	11
CONTEST: ARRL RTTY Roundup		1930 SEPAR Net 2000 SARC Net CW Course	1900 SARC <b>General            Meeting</b>			7:30-9:30 AM SARC Social: Kalmar Family Restaurant  CONTEST: NA QSO Party (CW)
12	13	14	15	16	17	18
CONTEST: NA QSO Party (CW)		1930 SEPAR Net 2000 SARC Net CW Course			Family Day	7:30-9:30 AM SARC Social: Kalmar Family Restaurant  CONTEST: Jan NA QSO Party (SSB)
19	20	21	22	23	24	25
CONTEST: Jan NA QSO Party (SSB)		1930 SEPAR Net 2000 SARC Net CW Course	1900 SARC <b>Exec            Meeting</b>			7:30-9:30 AM SARC Social: Kalmar Family Restaurant  SARC Social: Kalmar Family Restaurant Winter Field Day
26	27	28	29	30	31	
Winter Field Day		1930 SEPAR Net 2000 SARC Net CW Course				

Contest Details: <http://hornucopia.com/contestcal/contestcal.html>

# February 2020

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	<p>For details on all SARC events, go to <a href="http://ve7sar.net">ve7sar.net</a></p> <p>For details on all SEPARS events, go to <a href="http://separ.shutterfly.com/calendar">separ.shutterfly.com/calendar</a></p>					<p>1</p> <p>7:30-9:30 AM SARC Social: Kalmar Family Restaurant 8076 King George Blvd, Surrey, BC</p> <p>CONTEST: BC QSO Party (all modes)</p>
<p>2</p> <p>CONTEST: BC QSO Party (all modes)</p>	<p>3</p>	<p>4</p> <p>1930 SEPAR Net 2000 SARC Net CW Course</p>	<p>5</p>	<p>6</p>	<p>7</p>	<p>8</p> <p>7:30-9:30 AM SARC Social: Kalmar Family Restaurant</p> <p>CONTEST: Feb CQ WW WPX (RTTY)</p>
<p>9</p> <p>CONTEST: Feb CQ WW WPX (RTTY)</p>	<p>10</p>	<p>11</p> <p>1930 SEPAR Net 2000 SARC Net CW Course</p>	<p>12</p> <p>1900 SARC General Meeting</p>	<p>13</p>	<p>14</p> 	<p>15</p> <p>7:30-9:30 AM SARC Social: Kalmar Family Restaurant</p> <p>CONTEST: Feb ARRL Intl DX (CW)</p>
<p>16</p> <p>CONTEST: Feb ARRL Intl DX (CW)</p>	<p>17</p>	<p>18</p> <p>1930 SEPAR Net 2000 SARC Net CW Course Exam</p>	<p>19</p>	<p>20</p>	<p>21</p>	<p>22</p> <p>7:30-9:30 AM SARC Social: Kalmar Family Restaurant</p>
<p>23</p>	<p>24</p>	<p>25</p> <p>1930 SEPAR Net 2000 SARC Net Basic Course</p>	<p>26</p> <p>1900 SARC Exec Meeting</p>	<p>27</p>	<p>28</p>	<p>29</p> <p>7:30-9:30 AM SARC Social: Kalmar Family Restaurant</p> <p>CONTEST: NA QSO Party (RTTY)</p>

Contest Details: <http://hornucopia.com/contestcal/contestcal.html>



## ICS Salted with PMBOK for Field Day Jason Biggin VA7ITJ

### *Following up on a 1<sup>st</sup> place 2019 finish*

#### *The Project Management Body of Knowledge (PMBOK)*

For this year's Field Day exercise, I want to engage more SARC members and improve on how we prepare. Last year was a success, yet there were opportunities for greater clarity, efficiency and fun. This year I wish to combine two disciplines to refine our efforts. Here, I hope to initiate a foundation for us to join our efforts as we look forward to this year's event.

Last year we lightly utilized the Incident Command System (ICS) to organize ourselves for Field Day. I recognized that this tool is commonly used by clubs to ready themselves for this event, including previously by SARC. It was my first event (and second Field Day), to adopt this structure and felt that the green vest I wore more closely represented a greenhorn on a boat rather than one of incident authority. Further, the cultural values of those who assisted were diverse, with some advocating the benefit of ICS while others were less enthused. As a result, our efforts could have been distributed better and performed with increased efficiency.

resolve an urgent problem. As a result, those involved benefited from clear lines of authority, understood roles/responsibilities, and worked together to reach common goals, to name a few.

As this system was initiated to respond to events, its lens is primarily focused on what has occurred rather than what will happen. The incident action plan, a key component of ICS, describes the situation the objectives to reach during the operational period. With this, there is a triggering event that initiates the activation of personnel to assume ICS roles to typically save lives, reduce suffering, protect the public, infrastructure, environment and economy. For planned events, the triggers are proactive rather than reactive are require additional organization.

The Project Management Body of Knowledge (PMBOK) can be used to complement ICS for teams to plan for exercises. The PMBOK is a publication by the Project Management Institute (PMI) intended to advance the science and profession of project management. Within, there are ten recognized knowledge areas, including project (1) integration, (2) scope, (3) schedule, (4) cost, (5) quality, (6) resource, (7) communication, (8) risk, (9) procurement and (10) stakeholder management. There are also five general process groups, including (1) initiating, (2) planning, (3) executing, (4) monitoring/controlling, and (5) closing. As with ICS, the PMBOK does not prescribe how you must organize, instead provides a toolbox to empower you for the specific activity and goals. In common with both these disciplines, their applications are diverse and must be adopted for the need. When combined,

The ICS structure is well recognized in the emergency management field to respond to issues. This system was founded in the 1970s to assist responding agencies to address rapidly moving California wildfires. It was realized that there needed to be a common understanding of how diverse organizations can temporarily form a new structure to



PMBOK General Project Phase	Initiating	Planning	Executing	Monitoring	Closing
ICS Operational Period	1	2	3	4	5
Dates	Jan – Feb	March – April	May – June	June 27-28	July
ICS Functional Sections	Command	Command Planning Logistics	Command Planning Logistics	Command Planning Logistics Operations Finance/Admin	Command Operations Finance/Admin
ICS Main Objectives	Determine why & what we want to do	Determine how we are going to do it	Preparing for the event	Ensuring a safe and productive day	Reconciling expenses, saying thanks and reporting results
SARC Communicator Communication	January	March	May		July

the PMBOK aids with the longer-term planning of events while ICS aids with the roles and responsibilities of the group. The chart above provides a graphical view of what this looks like.

Within each phase/operational period, a separate action plan is crafted allowing the team to reach progressive milestones.

I sincerely believe there is an opportunity for more people to be involved and have fun with Field Day.

Individually we might be motivated by different aspects, including being social, inventive, competitive or prepared to help in case of an emergency. Field Day brings together all these aspects; however, we must work together to make it a success. As most of us lead busy lives, our time is precious, and therefore we must have a common understanding of how we will work together. I hope that you will allow me to lead this activity again and help to make it better.

73, Jason VA7ITJ

## Our 2019 Field Day Success!

#	Call	Score	Category	QSOs	Power Mult	GOTA Call	Section	Participants	Club
1	VE7SAR	4,294	3A	1,283	2		BC	55	Surrey AR Comms Soc
2	VE1LD	4,050	3A	992	2	VA1AVR	MAR	14	Kings Co & Annapolis Valley ARCs
3	VE3VM	2,222	3A	490	2	VA3NAG	ONS	24	NPARC
4	VE3RL	2,036	3A	475	2		ONE	20	Quinte ARC & Prince Edward RC
5	VE3QSR	1,726	3A	297	2		ONS	16	Georgian Bay ARC
6	VE7VVC	1,702	3A	197	2	VA7BFY	BC	75	Vancouver ECTO
7	VA7RER	1,674	3A	114	2		BC	13	Richmond Em Programs ARS
8	VE3EF	1,520	3A	321	2		ONS	13	Headwaters/Dufferin Hams
9	VE6FAR	1,440	3A	166	2		AB	16	Foothills ARS
10	VE9ND	1,388	3A	63	2		MAR	12	
11	VE6QE	1,290	3A	244	2		AB	14	Central Alberta ARC
12	VE7CMR	1,196	3A	273	2		BC	6	Maple Ridge ARC
13	VE7CRC	934	3A	132	2		BC	30	Campbell River ARS

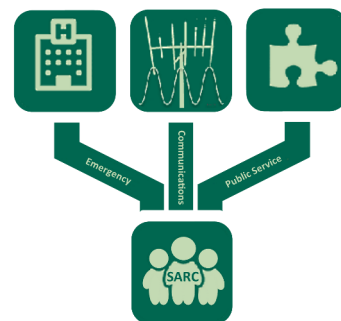
VE7SAR achieved top score in Canada (again) for 3A. Great work and congratulations to the SARC & SEPAR team members..

*How did we accomplish this again?*

Our planning this year followed the Incident Command System (ICS), a structured means of planning and staffing a large event. Our ICS approach to planning was described in detail in a [previous blog post](#).

# Public Service

Amateur Radio Serving The City Of Surrey



## *Public Service Thoughts for moving forward*

*Don Hamilton VA7GL*

Last month I discussed how we should be able to demonstrate our commitment to public service and emergency preparedness, by meeting or exceeding the City of Surrey's expectations. We discussed moving into the digital age of ham radio as amateur radio operators.

Yogi Berra is credited with saying "the main thing is to keep the main thing the main thing." So, what's SARC's main thing? In order to move forward shouldn't each member know, understand and work towards SARC's Main Thing?

The "Main Thing" is where you put your time, talent and resources. This simple statement needs constant attention to make it happen. The major challenges in today's information age are distractions and project creep. You know there is too much to do and too little time and money. So, maybe you go to your "Elmer" for suggestions of how you could prioritize. In other words, take time to discover what's your main thing.

I know, nice words, but I don't have either the time, money or talent. So, how can I best help?

The urgency is that you may have noticed that your environment is changing. The reason for this change is not within the scope of this discussion but the results of the change are. This what I would like to discuss with you, because the biggest challenges are the result of the changing conditions.

What happens if the Arctic low moves into your neighbourhood with -30 temperatures and 2 meters of snow? How can we assist then? Hint, you might have a look at some of the new members who are "off-roaders" and see how they cope in the back country.

Ok, here are some important questions that you might consider addressing for yourself:

- How long can I transmit when there is no power?
- Can I communicate with the OTC or EOC on simplex?
- What is the recommended backup simplex frequency?
- Do I have Winlink capabilities, i.e. can I send email from my radio?

The two most vulnerable areas in Surrey are Mud Bay and Bridgeview, for reasons of geography. You might run some tests to see if your equipment can communicate with them from your QTH.

When we volunteer to support public service/emergency communications we need to know the answer to these questions. This might suggest priorities for your time, talent and resources. For example, it won't be very productive to invest in only 20-meter equipment which may not be useful in helping your neighbour in a time of need.

Here are some suggestions to move forward: Do your homework on YouTube, or by consulting with RAC, ARRL and Prepared-BC. Also you might seek help from your Elmer. Or at SARC meetings, ask a SEPAR member to provide some advice on how you can best move towards your goal.

Being able to support our community when it's off the grid should be a priority. Don't we need to find out what the main thing is and to discover what our "neighbours" and the city managers are really looking for in time of need?

~ Don VA7GL

*SARC Public Service Committee Chair*





## SEPAR Report

*Gord Kirk VA7GK*



As we look forward to 2020 I wanted to start the year by thanking those of you who are involved in SEPAR. The Mission of SEPAR is “to respond in an emergency to facilitate communications between various agencies that may be without their own communications or network, or may have insufficient communications or network capacity in the event of an emergency, which could include natural or man-made disasters. To provide emergency communications to the residents of Surrey.”

We continue to plan, train, and test our equipment to make sure we are able to fulfill this mission. Over the last year significant time has been spent by several individuals to get a current baseline understanding of the various equipment and state of the SEPAR program. As we have met and discussed the future of the program, the City and Fire department have been providing their ongoing support and encouragement to further develop the program.

Often we see those in the front or visible areas of the various activities but there are many more that help make the SEPAR program what it is. Throughout the year many dedicated amateur radio enthusiasts help the SEPAR volunteers fulfill this mission. The list includes those who maintain the repeaters, those who help teach the licensing program for amateur radio licensing, and those who help organize many of the contest opportunities. These contests allow the practice of actual hands on skill development. There are many more than these three examples and I want to recognize that each of you have contributed to a more prepared community by your involvement. I encourage you to continue to do this. While enjoying “just a hobby” many of you have valuable experience that can help a new volunteer be a better radio operator.

As we continue to build on what has been previously organized we also looking to the future for new opportunities. As digital modes are being used by many due to poor propagation, this is also developing opportunities to transition these modes over to support emergency communications as well. Over the last year a closer relationship with the City of Surrey Neighbourhood Emergency Preparedness Program (NEPP) has been developing. Several individuals from NEPP have become amateur radio operators through the SARC training program and will be adding their new skills to help in their neighbourhoods with communications, if needed.

As well this last year Surrey Fire Department opened a training opportunity up to SEPAR to attend a Rapid Damage Assessment training program which helps an “untrained” person recognize damage to buildings which may make them unsafe after a

flood or earthquake etc. As amateur radio operators live throughout all of Surrey this could provide rapid assessments after a major earthquake to help the city with its response. Something as simple as a report of what you can see from your front porch (or from your balcony 10 floors up) can be extremely important information. SEPAR will be working on training to do just this over the next year.

As the Communicator distribution goes far beyond only SEPAR members and SARC members I encourage all licensed amateur operators to think about how you can support you local emergency program in 2020.

- Check into the SEPAR (or other local) net often. The SEPAR net is open to all licensed amateurs, if you are newly licensed don't be afraid of making a mistake, the biggest mistake is not trying at all. You will be supported.
- Make sure you can program and use your radio. We can help with a list of local frequencies and help you get set up.
- If you only have a handheld radio, add to it a better external antenna. The SARC radio training helps everyone make an antenna at the end of the course. It is inexpensive and can greatly improve your radio signal.
- Be personally prepared. Take some time and learn about what it takes to have enough food, water, medications etc. on hand so you don't become part of the problem but rather are available to help.
- Participate in training. You are welcome to attend SEPAR training as it is offered.
- Specifically to radio, think about your communication plan for your family. How would you check in if something happens and you are at work, where would you meet? How could amateur radio help in this? What can I do if I am the only one licensed in my family?

I hope as we move through 2020 we plan to address several of the topics mentioned above. SEPAR meets on the 4th Thursday of each month at the Surrey Fire Training Center.

The dates for the half of the year are: January 23, February 27, March 26, April 23, May 28 and June 25.

I wish each of you a safe and fun 2020, and hope you are active on your radio...

~ Gord VA7GK  
SEPAR Coordinator

## At The SARC Meeting...

November 13, 2019

### November General Meeting



**SARC General Meeting Minutes**  
November 13, 2019

**Attendees:** 26

**Meeting Start:** 7:07pm

**Location:** Surrey Fire Training Centre

#### **Welcome**

Stan welcomed everyone to the November meeting and is glad to see those returning from travels in recent weeks.

#### **Health and welfare**

Nothing heard.

#### **Financial**

Scott provided our current financial status.

Name tags will be ordered shortly with the new name SARC (Surrey Amateur Radio Communications). Contact Scott if you're interested in ordering a name badge.

#### **Committee Reports**

##### **OTC**

Stan: We now have an official request to vacate the OTC from the City of Surrey. Anton who has helped coordinate the move thus far will be absent for the duration of the move.

We need someone to help coordinate the move from the OTC to a new location. Estimating a week and a half from now we will be moving and need assistance from the membership.

We have a tower stored at Fire Hall 11. This tower is approx 15 meters tall. We need someone that can help with the engineering

and planning for a concrete base for the tower, planned to be set up near the new OTC.

#### **Christmas Party**

Jinty asked who has confirmed their attendance so far and asks for those that may plan to go to contact her ASAP.

**Location:** Guildford Golf and Country Club.  
7929 152 St

**When:** Saturday Dec 7th 11am-2pm

**Meal Includes:** Turkey and all the fixings, vegetarian dishes available upon request, alcohol is available for purchase

**Cost:** \$25 per person. You can purchase tickets by paying Scott at the meeting or online via the Paypal donation link on the website. (be sure to add a comment if you use Paypal and say the funds are for the Christmas Luncheon)

Please RSVP to: [jinty.reid@gmail.com](mailto:jinty.reid@gmail.com)

#### **Contesting**

John VA7XB: The CQ WW DX (CW) contest is this weekend and will be run from John's QTH. He is requesting the use of the club linear amplifier for the contest. No objections heard. John may also request the use of the amplifier again for the RAC winter contest if the OTC is not setup by then.

Don VA7GL: Vector has a VHF contest this weekend. Details can be found on Vector's website. Be sure to view the 2019 contest details and not the 2018 details.

John VA7XB: We need an Elmers committee with a list of names willing to assist new hams. Please contact John VA7XB.

### New Business

Kjeld has a rather large Marine Radio (HF?) sitting at his home and he'd like to find a new home for it. If you're interested contact Keld.

Break at 7:37pm  
End at 8:00pm

### Presentation: DMR

Doug Pattengale [VE7CQT@gmail.com](mailto:VE7CQT@gmail.com)

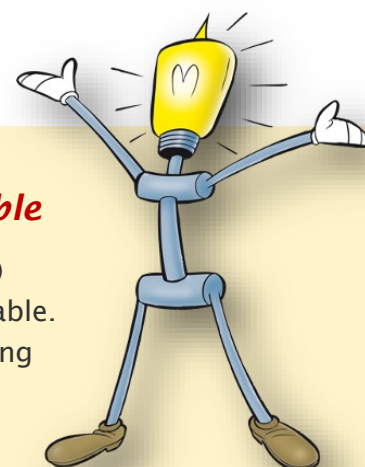
Brad Wilson [VA7BWV@gmail.com](mailto:VA7BWV@gmail.com)

A large number of hams are using newer Internet-linked radios that depend on the Internet for a lot

of their connectivity and functionality. This is called "DMR", for Digital Mobile Radio. It is an older system based on protocols from Motorola. My own concerns with DMR are that a hack could bring down the entire global DMR network. Huge DOS attack possibilities. Sort of like what we were concerned about with the E-Comm radios. This might be an interesting topic as it could affect amateur radio emergency comms greatly.

Meeting Adjourned at: 9:07pm

~ Jeremy Morse VE7TMY



## Second Generation 80m Foxhunt Receivers Will Soon Be Available

This year we didn't have a lot of foxhunting (aka "RDF" or "radio direction finding") competitions, mainly because an insufficient number of 80 m receivers were available. In response to interest from the foxhunting community, we decided to start building more 80 m receivers, using VA7OM's latest design.

Ten prototype units currently in production are expected to be complete this year with a full run of 100 more in the Spring, ready ahead of the 2020 foxhunting season. At the same time, low cost micro-fox transmitters for training purposes and full power ones for competition will be available. We look forward to the new foxhunting season and hope that these new and improved units will promote even greater participation in RDF.

Price is yet to be decided. Orders will be taken once the new units are available. Stay tuned for further announcements!

~ Les Tocko VA7OM, Dave Miller VE7HR and John Brodie VA7XB



Left: A 1<sup>st</sup> generation 80m unit. Right: A prototype of a 2<sup>nd</sup> generation 80 m RX, soon to be in production



# *The 2019 SARC Christmas Party*



*Lots of good company and  
food and a generous  
assortment of door prizes to  
go around.*

*A BIG thank you to Jinty for  
organizing the event again  
this year... well done!*



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## No-Ham Recipes

*Celia Reed ZL1ALK*

### ***Baked Feijoa Pudding***



Feijoa fruit ranges from  $\frac{3}{4}$  to  $3\frac{1}{2}$  inches long and vary in shape from round to elongated pear shape, with the persistent calyx segments adhering to the apex. The waxy skin is dull blue-green to blue or grayish green, sometimes with a red or orange blush.

Skin texture varies from smooth to rough and pebbly and is  $\frac{3}{16}$  to  $\frac{5}{8}$  inch thick. The fruit emits a strong long-lasting perfume, even before it is fully ripe. The thick, white, granular, watery flesh and the translucent central pulp enclosing the seeds are sweet or subacid, suggesting a combination of pineapple and guava or pineapple and strawberry, often with overtones of winter green or spearmint.

These recipes were given to Celia by her mother.

Feijoas ‘fay yoh uhs’ are green, ellipsoid fruits native to South America and now grown in New Zealand and California. The sweet flesh tastes like a combination of several fruits, usually described as pineapple, guava, and strawberry. If you’re buying feijoas, look for fragrant fruit that feels firm but gives slightly when very gently squeezed. In a perfectly ripe feijoa, the centre is clear and jelly-like, not white (under ripe) and not brown (over ripe).

- 1 cup (250 ml) self-raising flour
- $\frac{3}{4}$  cup (200 ml) sugar
- 1 egg
- 3 ounces (100 ml) melted butter
- 1 cup (250 ml) feijoas, peeled and chopped (or cut in half, scoop pulp out with a spoon and chop pulp)
- $\frac{1}{2}$  teaspoon (125 ml) grated lemon rind

**Preheat oven to 350F (180C or a moderate oven)**

Sift flour into bowl. Add sugar, and then add beaten egg. Mix well. Fold feijoa and lemon rind into the flour mixture. Place mixture in a buttered cake pan and bake at 350F for 45 minutes.



### ***Social Reminder***

The Surrey weekly social gathering is on Saturday at the Kalmar Restaurant at 80th and King George Boulevard between 7:30 and 9:30 am. You don’t have to be a SARC member to participate. Bring your significant other, bring your family, see old friends and have fun.



QRT

## CW – the Original (and arguably, the best) Digital Mode

John Brodie VA7XB

Invented in 1837, CW which is more commonly known as “Morse Code”, was the very first mode of communication sent over a wire or airwaves. It is called CW or “continuous wave” because it is an unmodulated radio wave of constant amplitude, though it might more accurately be called “discontinuous wave” since the wave is broken into short and long segments separated by spaces, to represent letters of the alphabet, numbers and punctuation marks. It is legitimately a digital mode because it exists in only 2 states – “on” or “off”.



The length of the dot (or “dit” as we prefer to say) and dash (or dah) and the spacing between them is not arbitrary but has a fixed relationship. If the relationship is not correct, the quality of the CW will be recognized as “poor” and in extreme cases may be virtually unreadable. While most CW heard nowadays is created by software and is therefore perfect, we occasionally hear on the radio less-than-perfect Morse Code, sent by operators still using a mechanical device such as hand key or bug.

Since CW has largely been abandoned by the commercial, military and transportation world, it is now virtually within the sole domain of amateur radio operators, whose passionate adherents will likely stand by it to the bitter end. So, if you think CW is dying out, then listen on the 20 m band during one of the many CW contests throughout the year. You will be amazed at the number of CW operators sending

Morse Code at rates between a lazy 15 wpm and the a breakneck 50 wpm or more, from every corner of the world.

If you wish to use radio to communicate by the most reliable and sensitive means, you will not use CW at all, but instead will use one of the modern “weak signal” digital modes such as FT8, JT65 and a whole slew of others, which have transformed our ability to accurately copy signals which may be so weak that you cannot actually hear them. This is a boon to communication as it allows information to be exchanged even when using low power transmitters and poor antennas – unavoidable for condo dwellers. So these forms of digital certainly have their benefits.

However, if you wish to enjoy amateur radio in the most traditional, challenging and enjoyable way, you will find CW is the method of choice. Yes, you can deploy digital decoders to help you read CW on a computer monitor, and many do. However, even the best digital decoders are inferior to your ears and brain working together. So if you are serious about using CW, you really must learn to copy it by ear.

As a beginner, you will likely start with a hand key to send the characters which require a separate wrist movement for each dit and each dah. In the past, CW operators would typically graduate to a semi-automatic key called a “bug” which sends a series of dits when the paddle is pushed one way, but single dahs when pushed the other way. That certainly takes some of the work out of sending. Actually very few CW operators now use a bug although the holdouts can still be heard on the airwaves.

”

*...if you wish to  
enjoy amateur  
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enjoyable way, you  
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15684 102 Avenue  
Surrey, BC V4N 2G4

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[repeater at ve7sar.net](mailto:heinz@ve7sar.net)

CW sent by a hand key or bug is usually distinctive of the operator and can often be recognized in the same way that a person's individual handwriting differs from that of others. During WW 2 the identity of Axis and Allied radio operators could often be recognized by their "fist" i.e. individual way of sending code characters.

Hand  
key



Semi-automatic Vibroplex "bug"

Nowadays, 95% of CW operators use a paddle and electronic keyer to send CW. This combination is a big step up from the hand key and bug because it allows sending virtually perfect CW, which means the dits and dahs are of the correct length and spacing. The keyer can be a separate unit into which you plug your paddle or, more commonly, it is built into the transceiver. You push the paddle one way and it makes a string of dits; push it the opposite way and it makes a string of dahs. It is not difficult to master and the result is uniform and perfectly formed CW.

Kent  
paddle



Benchner  
paddle



Electronic keyer with built-in paddle



External Electronic keyer which  
requires a separate paddle

You may occasionally hear about "iambic keying" which allows the keyer to minimize the keystrokes or hand movements even further. To visualize how it works, consider the letter "C" which can be sent iambically by merely squeezing the two paddles together. With a single-paddle or non-iambic keyer, the hand motion would require alternating four times for C (dah-dit-dah-dit). Most CW operators have not mastered this technique and it is not recommended for beginners.

If you're stuck in a rut and looking for a new and challenging experience, consider learning CW. Persistence and practice will get you through in the end and you will be ready to join the select group of hams known as "CWers". I heartily recommend it.

~ John VA7XB



## January

On January 8th our first meeting of the new year will feature the topic "Getting On The Air" with a sub-theme of improving your signal for those already active. While geared toward newer hams, we feel there is benefit for all who may have RF and antenna challenges. You are also invited to bring any good used gear for sale to our recent course graduates or other SARC/SEPAR members.

## February

On Wednesday, February 12th, Hardeep Mehrotara VA7HKM will present an overview of cybersecurity and communications in our Ham world of Internet linked transceivers.

Hope to see you on Wednesday, January 8 and February 12 at 7pm.

**SARC** hosts an Amateur Radio net each Tuesday evening at 8 PM. Please tune in to the VE7RSC repeater at 147.360 MHz (+600 KHz) Tone=110.9, also accessible on IRLP node 1736 and Echolink node 496228.

On UHF we operate a repeater on 443.775MHz (+5Mhz) Tone=110.9 or IRLP Node 1737.

*We are looking for a SARC Net Manager. Its not a difficult job and, if you have some time to spare, we'd like to hear from you. Basically it involves scheduling someone to do the Tuesday evening weekly net.*

	SARC Net 20:00 Hrs
1 <sup>st</sup> Tuesday Standby	VACANT Vacant
2 <sup>nd</sup> Tuesday Standby	Jinty VA7JMR Sheldon VA7XNL
3 <sup>rd</sup> Tuesday Standby	Rob VE7CZV Vacant
4 <sup>th</sup> Tuesday Standby	Kapila VE7KGK John VA7XB
5 <sup>th</sup> Tuesday Standby	Robert VA7FMR John VE7TI
Want a turn at Net Control? Contact the SARC Net Manager	

## Down The Log...

### SARC Monthly Meetings

2<sup>nd</sup> Wed. (Sept-Jun)  
1900 hrs at the [Surrey Fire Service Training Centre](#),  
14923 - 64 Avenue,  
Surrey, BC. Here is a  
what3words link and map:  
<https://what3words.com/markers.addiction.ozone>

### Weekly SARC Social

Saturday between 0730  
and 0930 hrs at the  
Kalmar Family Restaurant  
8076 King George Blvd.  
Surrey

### SARC Net

Tuesday at 2000 hrs local  
on 147.360 MHz (+)  
Tone=110.9

### SEPARS Net

Tuesday at 1930 hrs local  
on 147.360 MHz (+)  
Tone=110.9

### VE7RSC Repeaters

2m: 147.360 MHz +  
Tone = 110.9 Hz  
IRLP node 1736  
Echolink node 496228

1.2m: 223.960 Mhz -1.6  
Tone=110.9

70cm: 443.775 MHz +  
Tone = 110.9 Hz  
IRLP node 1737





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